Geary Transit Task Force Final Report

October 1989

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GEARY TRANSIT TASK FORCE

FINAL REPORT

Presented to
The Mayor, The Board of Supervisors, and
The Public Utilities Commission of
The City and County of San Francisco

As Authorized by:
Board of Supervisors Resolution No. 848-86

Prepared by
The Municipal Railway of San Francisco
Service Planning Department

October 1989

A-1 7-20-90

FIRST PRINTING AUGUST 1990
SECOND PRINTING SEPTEMBER 1990

ACKNOWLEDGEMENTS

Without the vision and the support of two Mayors, Art Agnos and Dianne Feinstein, and the San Francisco Board of Supervisors, who created the Geary Transit Task Force, the future of the Geary corridor and the inadequacies of transit service in the corridor would not have been addressed; without continuation of such vision, the question of a better future for transportation in the corridor would remain unresolved.

As the Geary Transit Task Force did not have a special staff or budget, several City departments provided technical support for the Task Force, in the form of speakers at Task Force meetings, as well as, logistical support, as follows:

- Peter Straus and Carl Natvig of San Francisco Municipal Railway Service Planning provided technical support, logistics, minutes, and authored this report. Duncan Watry, James Lowé, and Fannie Lee Lowe of the Municipal Railway Service Planning staff provided graphics and editorial assistance.
- Rebecca Kohlstrand and Bill Wycko, Department of City Planning (technical support)
- Norman Bray, Department of Public Works (technical support)
- Gail Bloom, SFPUC Bureau of Finance (technical support)
- SFPUC Reproduction Department (report printing)

In addition, Task Force member, attorney Steve Taber, who has served as a legal financial advisor to numerous transit districts, provided technical support on transit financing to the Task Force.

We gratefully acknowledge the pro bono assistance of DKS Associates for the graphic materials in this report and of Richard Tolmach for the report cover.

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Note: The members of the Task Force were selected from these organizations to provide a cross section of views on the issue of transit in the Geary corridor. These affiliations do not imply endorsement of this report by these organizations.

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SUMMARY REPORT AND RECOMMENDATIONS
(14 OCT 88)

The Geary Transit Task Force, consisting of 21 members appointed in 1987 by the Board of Supervisors and Mayor Feinstein, held ten meetings between August 1987 and September 1988 to consider what future transit improvements may be appropriate for the Geary corridor. The Task Force also held a public meeting in July, and has made presentations to five community organizations.

Light Rail for Geary

The recommendation of the Task Force is that a light rail transit service (LRT) would be the most useful and desirable mode of transportation that could be economically provided in the Geary corridor, and that the City, the PUC and the newly formed Transportation Committee should establish provision of a Geary light rail line as a capital priority.

With 50,000 riders daily making Geary one of MUNI's busiest trunk lines, the Task Force's recommendation concurs with the City's Master Plan, and with the findings of numerous previous studies of the Geary corridor, which have consistently found a Geary rail project to have strong technical merit.

Geary light rail would furthermore be one of the nation's most productive New Rail Start projects, and should therefore be highly competitive in attracting federal and state funding participation.

In its deliberations, the Task Force considered concepts ranging from retention of present bus service, to conversion to trolley coach, to provision of BART service, before recommending light rail. Specifically, two alternate LRT service concepts are recommended for consideration: an all-surface system or a combination surface and downtown subway system.

Process

At its ten meetings, the Task Force considered topics including traffic, urban planning, demographics, characteristics of light rail and other modes, transit alignment alternatives, and transportation finance. In July a public meeting was held, attended by about 70 people. Of 24 speakers, 18 supported LRT on Geary in some form.

The Task Force has also made slide presentations to SPUR, the Richmond Community Association, the Geary Merchants and Property-Owners Association, the Western Addition Neighborhood Association (WANA) and the Greater Union Square Association.

The goal of the Task Force was to seek consensus for transit improvements in the Geary Corridor. Although this summary does not report on capital funding considerations per se, it is the belief of the Task Force that all of the alternatives discussed below are within a range of feasible projects, and could compete successfully with other transit capital projects in the region, the state, and the country.

Preferred Surface Light Rail Concepts

The Task Force considered several ways in which an all-surface operated LRT project, such as those in Portland, San Diego, San Jose, Sacramento and other cities, could be constructed. The principal advantages of a surface LRT project are low cost, a more pleasant environment for riders, and more stops downtown with quicker access times to stops. A surface line is estimated to cost approximately $60 to $100 million (exclusive of vehicles and support facilities), while even a partial subway alignment would cost $400 to $500 million.

Assuming the use of traffic signal pre-empts and timings to favor light rail, and median rights-of-way in most areas west of Gough, a surface LRT system was judged to offer significant benefits in travel time and reduced operating costs over current operations. Two preferred alignments for a surface LRT system were identified.

The first would use Geary Street downtown for light rail in both directions. Various simple and effective techniques for reducing traffic on Geary and redirecting traffic to other streets could be employed.

For example, to provide adequate auto capacity, Post Street would again become a street for westbound traffic feeding Geary Boulevard at Gough, with O'Farrell continuing to serve eastbound traffic from Geary Boulevard, but without bus service on either Post or O'Farrell to slow traffic.

To speed light rail transit on Geary and redirect autos to parallel Post and O'Farrell Streets, such techniques as shorter traffic signal green times on Geary with pre-empts for light rail, signal timings on Geary Street favorable to transit rather than to autos, light rail-only lanes adjacent to the curb where feasible, and redirection of auto traffic off Geary Street at Kearny and at Gough could be implemented. These low impact techniques would reduce auto traffic on Geary to a level that would allow smooth unimpeded flow of light rail vehicles most of the time, even with auto access to the street and mixed flow of LRT and other traffic.

The second surface option would use Geary and O'Farrell, the two streets used now by 38-GEARY buses, but with permanent transit exclusive lanes on one side of each street, next to the curb. These might be constructed using cobblestones around the tracks, as in Portland, to create a transit-only lane that is both attractive and effective in discouraging auto encroachment.

In either case, the Task Force assumed service would merge onto Market Street, and could terminate, at least initially, at the Transbay Terminal or at the Ferry Building. (The line could be extended to a terminal in the rapidly developing south of Market area.)

West of Gough Street, a surface line would be constructed in the median of the Geary Expressway. Additional engineering design is necessary to define optimal alignments at Fillmore and Masonic, but it appears a bridge to street grade level would work at Fillmore, while at Masonic a brief sub-surface alignment may be necessary. However, operation along the existing expressway levels may also be feasible, with careful coordination with traffic signal controls and other considerations.

West of Collins, the preferred alignment would be in a median exclusive right-of-way, which could be landscaped with grass (as in New Orleans) or another low ground-cover. In some areas, operation in mixed-traffic and loading from the left-side central median could also be considered. The Task Force found these treatments could be combined variously to ensure retention of present surface parking west of Masonic. The present number of traffic lanes in The Richmond would also be retained, although slightly narrowed.

Preferred Subway-Surface Light Rail Concepts

The concepts recommended by the Task Force for a combination surface light rail with subway downtown would be identical west of Laguna Street to those discussed above.

East of Laguna, however, such alternatives would use a subway similar to the Market Street MUNI Metro subway to reach downtown. Trains would enter the subway at a portal near Laguna Street on Geary Boulevard, and operate to downtown under either Post Street or Geary Street. Stations would probably be located at Van Ness Avenue, Jones/Leavenworth, Powell/Union Square and Montgomery or Kearny Street.

A subway, as noted above, would require a significantly higher capital investment than a surface alignment. The principal benefits would be the 4-to-5 minutes faster travel times afforded by completely grade-separated operation and fewer stops (although access and egress time at stations would negate this in part), freedom from traffic tie-ups, and a reduction in transit vehicles and transit lanes on the surface. It would avoid the need for any changes in traffic flow, and would avoid any reduced curb access to hotels and other businesses along Geary.

Although the direct time savings appear small, if increased reliability and the value of patrons' time savings is included at average wage rates, a reasonable case could be made for the high capital cost investment for a subway.

A Geary corridor subway downtown is severely constrained at Market Street by the existing MUNI and BART Market Street subways. For example, there is only one location--Kearny/Third streets--at which it even may be feasible to cross Market Street underground, and trains also cannot merge directly into the existing Market Street MUNI subway.

Faced with these constraints, the Task Force nonetheless felt strongly that it was imperative that a subway alignment allow for future extensions and passenger connections. Specifically, the following future options should not be precluded: (a) crossing Market Street at Third and Kearny at the Market Street subway's mezzanine level if feasible, and (b) extending north under Kearny or Montgomery Streets.

In any event, a subway should include a downtown station integrated with the Market Street subway's Montgomery Station, and allowing integration with a possible Market Street subway terminal of a Peninsula Rail line extension to downtown via Second Street. A Post Street subway alignment east of Gough, connecting to the Geary Expressway via Peter Yorke Way, was favored by several Task Force members as perhaps the best means for achieving these goals.

It should be noted that one Task Force member strongly supported a subway in the commercial area of Geary between Collins and 25th Avenue, but other members of the Task Force did not concur.

Recurrent Operational Costs

The Task Force concluded that the combination of the higher capacity of light rail vehicles over buses, transit priority at traffic signals, median operation, and use of a contemporary, low-maintenance vehicle, are expected to bring transit riders not only improved service, but potentially increased efficiency, and hence reduced per passenger operating costs.

Self-service, or "proof-of-payment" (POP), fare collection has been used in many cities to allow a single operator to control a train of two or more light rail vehicles. As demonstrated in Portland, San Diego, Sacramento, San Jose and elsewhere, POP has the potential of offering even greater operating cost savings for a Geary LRT project. POP may also reduce travel times because passengers can board at any door.

Vehicle Design and Accessibility

The Task Force was very impressed with some of the recent designs of low-floor light rail vehicles being developed for Grenoble and several Swiss cities, which would allow level access for wheelchair-users and other passengers at all stops without requiring high-level platforms. The Task Force believes use of a low-floor car for Geary deserves consideration.

Task Force Recommendation

It is the Task Force's recommendation to the Mayor and the Board of Supervisors that a Geary light rail project be included as a high priority project in the Public Utilities Commission's Municipal Railway Capital Improvement Program (CIP). It is also recommended that the Transportation Committee currently considering San Francisco's future transportation needs and financing for the next 15 years establish Geary light rail as a high priority project and take appropriate actions to seek timely implementation.

GEARY TRANSIT TASK FORCE FINAL REPORT

1. INTRODUCTION

The Geary Corridor Transit Task Force was established by the Board of Supervisors in 1987 to evaluate appropriate alternative transit improvements in the Geary corridor. The Task Force was not intended to produce a final study; this is the initial stage of a process that may lead to a Geary rail line. The 21 members of the Task Force were appointed by the Board and Mayor Feinstein and include representatives of both city-wide and Geary corridor neighborhood and business groups. It has held nine meetings, covering topics ranging from demographics and traffic issues to transportation finance. The Task Force identified a number of factors which may support significant public transit improvements for the Geary corridor.

First, there are increasing numbers of cars, both in San Francisco and coming into the city. Traffic congestion is worsening, slowing both autos and transit. As San Franciscans continue to rely more on MUNI for trips within the City, it may be time to consider a transit system which can be effectively separated from traffic congestion on city streets.

Second, it is frustrating that travel times on the Geary buses are the slowest of all the major San Francisco travel corridors: In 15 minutes, MUNI Metro can take you from downtown to West Portal, and BART can take you to Balboa Park and to Oakland. In 15 minutes, the 38-GEARY hardly gets you past Van Ness Avenue. In the half hour BART takes to get commuters to Orinda, or that CalTrain takes to get to Burlingame, the 38L-GEARY LIMITED bus only gets you to 6th Avenue. Despite the fact that the Richmond corridor is served by many buses which serve many riders, you cannot get around as quickly as in other parts of the City. Many Task Force members believe the neighborhoods along Geary deserve better transit service.

Even express buses cannot satisfactorily address the problem. First, the Geary express buses only carry 3000 of the 50,000 daily riders on Geary, and, second, even the expresses are slower than those in other corridors where there are freeways.

In addition to the problem of annoyingly slow operation of the existing service on Geary, the detracting factors of poor ride comfort, exhaust, and noise were considerations which led the Task Force to conclude that an improved transit service for Geary would be appropriate for further consideration by the City. Various technologies including trolley buses, heavy rail, and light rail, as well as, the less conventional modes such as guided buses, monorails, automated rapid transit, and magnetic levitation vehicles were examined. Also, various operating techniques such as subways, elevateds, and a wide variety of transit priority methods were discussed before narrowing down the most appropriate and affordable choices for the Geary corridor.

As a result of this process, including a public meeting and monthly meetings of the Task Force for a year, the conclusion was that light rail offered the greatest opportunity for improving transit over a wide range of parameters including comfort, capacity, environment, speed, public acceptance, operating cost, and capital cost. The Task Force also concluded that considering the availability of a wide boulevard, the high level of demand, and the availability of funds, the most appropriate application of the light rail mode would include a landscaped transit median west of Gough and either a subway or some arrangement of transit-only lanes and effective transit priority treatments to the east of Gough. A complete discussion of the factors influencing these conclusions and recommendations to the City and a description of the recommendations follows.

FIGURE 1

At present, overcrowded, noisy, exhaust spewing diesel buses move slowly through heavy traffic, tediously fighting to get in and out of curb stops.

2. BACKGROUND

The first discussion of light rail for Geary occurred around the year 1900 with debates over whether the City should build its own transit system to provide an alternative to the less than universally loved service of the privately owned transit operations of the time. The result was the "A" streetcar line on Geary opened on December 28, 1912, the first streetcar line of the first municipally owned transit system in the United States. The Geary line replaced a combination cable car and steam powered rail car line. The "A" and later "B-Geary" proved popular and led to the construction of several additional streetcar lines in the City, including the K, L, and M Twin Peaks tunnel lines, the N, Sunset tunnel line, the J-Church line, the H-Van Ness-Potrero line, the "D" and "E" Union Street lines, and the F-Stockton line. These streetcar lines successfully provided nearly city-wide competition to the larger private Market Street Railway Company system.

Streetcar service continued on Geary until 1956. In that year, a scheme to widen Geary Street into an expressway through the Western Addition complete with an underpass at Fillmore Street displaced the track. Money was found for this huge project, including removal of track from the entire route; however, no money could be found to move the track to align with the new expressway median. In response, the Municipal Railway proposed to replace the "B" streetcar, as well as some other streetcar and motor bus lines, with trolley buses; however, the bond measure to pay for these projects fell a few points short of the two-thirds majority needed to pass.

Since that time, patrons obliged to ride the diesels have bemoaned this loss and some have called for a new light rail or rapid transit line. A rapid transit line for Geary was mentioned as a future project in the plan for the transit bond issue of 1966. This bond issue, whose primary purpose was to replace trolley bus lines with diesel buses, was defeated. One result of this interest in a rail rapid transit line for Geary was the inclusion in the BART legislation of the obligation of BART to conduct an extension study for the Geary corridor. This study, the Northwest Corridor Extension Study (NWX), was conducted in 1973 and 1974.

A regional rapid transit line out Geary from Market Street to Park Presidio Boulevard and, thence, across the Golden Gate Bridge to Marin County had been part of the BART comprehensive system plan since the 1950's. Since Marin County had decided not to be part of the BART district, this plan had been shortened to a branch on Geary alone. With this rapid transit oriented BART plan in mind, the Northwest Corridor Extension study included an analysis of a number of subway oriented alternatives including a subway to either Laguna or 17th Avenue and surface operation to 48th Avenue to be operated with Muni Metro style cars. Another variation of the subway to 17th Avenue included branches from portals at Masonic to surface lines on Balboa and California Streets. Unfortunately, none of the alternatives were all surface or mostly surface versions of light rail, despite recommendations and interest from members of the public in such a low cost alternative. Instead, alternatives involving diesel bus subways or rail overpasses in the avenues were studied.

At the end of the year and a half study process which involved continuous public meetings, the subway alternatives were rejected by the study Board of Control in response to organized and strident citizen opposition. This opposition centered around fears of construction impacts similar to those experienced on Market Street during BART construction and fears of growth which would presumably be induced by the high capacity

of a subway rail system such as those in New York or Chicago. The final recommendation was to improve the existing bus system with additional express bus routes from the financial district to the Richmond District which would by-pass the Union Square shopping district downtown and the Western Addition completely.

Bus service restructuring was implemented in 1979 and included four new zoned express routes: two on Geary and one each on Balboa and California Streets. These were later split into two zoned "A" and "B" expresses on each route. In addition, the existing limited service on Geary, which had limited stops only in the Western Addition, became a much faster service with limited stops from Mason Street in the downtown to 33rd Avenue in the Richmond District with more frequent service. However, the express and limited service is still provided only during weekday, daytime hours. At the same time, the express and limited stop service on the 2-Clement was discontinued leaving only local service.

These changes were popular, resulting in an 11% increase in patronage in the corridor. However, there was little benefit to the downtown residential area east of Van Ness or to the Western Addition. Moreover, the basic problem remains that more than half of all patrons on Geary must still ride slow, erratic, local service in heavy traffic on uncomfortable, crowded, diesel buses. Not everyone can walk the extra distance to the limited or express stops, and many use transit on weekends or evenings when the faster service is not available. This continuing unsatisfactory situation led many citizens to believe that something better was needed.

In 1986, a proposal was made by Municipal Railway staff to convert the Geary service to trolley coach operation in order to increase passenger comfort and improve environmental conditions. This proposal was met with luke-warm support and some opposition. Much of the opposition was based on the observation that much greater improvement in comfort and speed would result if the line were converted to light rail service. Short light rail trains in a transit median could relieve crowding and provide faster, more reliable service than either diesel or trolley coaches. The trolley coach proposal was subsequently dropped by the City.

Later that year, in response to this suspension of progress, a group of citizens formed the Geary Streetcar Citizen's Committee. They quickly circulated petitions in the neighborhoods easily gathering 600 signatures and then petitioned the Board of Supervisor's and the Mayor to form a citizen task force to evaluate transit needs in the corridor and the efficacy of reinstating light rail in its modern form. Legislation forming the Geary Transit Task Force (Resolution 848-86) was passed and signed by the Mayor in June of 1987. The Task Force consisted of individuals selected by each member of the Board of Supervisors, the Mayor, and the Municipal Railway and then officially appointed by the Mayor. The Task Force was selected to provide a cross-sectional representation of residents and businesses in the Geary corridor. The Task Force was charged with reporting back to the Mayor, the Board, and the Public Utilities Commission after one year of study.

3. TRAFFIC ISSUES

Auto ownership in the City has increased dramatically in the past decade. It should be noted, however, that some of this apparent increase may be as a result of a change in the residential permit parking ordinance. This change required autos to be registered in the City to qualify for parking permits resulting in cars being re-registered in San Francisco that were previously parked in the City, but registered elsewhere. Regardless, the number of cars currently flowing down Geary between Baker and Lyon, the peak load point on Geary during the peak hour, is at the maximum capacity level. Also, off-peak traffic is increasing rapidly as well. (See Tables 1 through 4.)

However, the limited availability of parking downtown constrains growth of vehicular traffic east of Van Ness - a good thing since the street system would be extensively grid-locked, but for that constraint.

One issue, then, is how to accommodate LRT on Geary west of Van Ness without congesting the street or forcing autos onto parallel streets. Another issue is how to accommodate regional travel with LRT when many autos turn off Geary at Gough to access the freeway as demonstrated by the fact that the peak load point is at Lyon Street, rather than someplace in the downtown.

The solution to the latter problem of regional connectivity would clearly be addressed by the faster and more reliable service possible with LRT and transit priority treatment. Auto drivers on Geary who are now traveling to East Bay and Peninsula points by freeway would be able to reach BART at Market Street, AC Transit at the Transbay Terminal, and a planned new extension of Peninsula rail service at either the Montgomery BART station or the Transbay Terminal more quickly by LRT than at present on buses.

Since the street west of Masonic is 99 feet wide with a 14-foot median, LRT could be located next to the existing median in the traffic lane and load passengers from the median. This approach would retain left turn pockets, and would be similar to a treatment applied to a portion of Sacramento's new light rail line. In such an approach, light rail would operate in mixed traffic.

If exclusive lanes or a transit median were to be provided, trade-offs would be necessary: Either 1) traffic lanes would have to be narrowed, 2) the median would have to be narrowed, 3) diagonal parking would have to be replaced by parallel parking, 4) existing parallel parking would have to be removed, or 5) a transit-only lane would have to be substituted for a traffic lane in each direction. Also, treatments can vary from segment to segment along the street. These types of treatments are discussed in greater detail in Parts 7 through 9 following.

TABLE I

GEARY BLVD. - 1986 WEEKDAY TRAFFIC VOLUMES

Between Gough and Laguna Sts.	45,800
Between Baker and Lyon Sts.	54,000
Between 9th and 10th Aves.	45,000
Between 16th and 17th Aves.	31,500
Between 25th and 26th Aves.	25,900
Between 34th and 35th Aves.	15,800

GROWTH IN DAILY TRAFFIC

Geary Blvd. between Baker and Lyon Sts.

1966 - - 32,300

1976 - - 39,900

1986 - - 54,000

Growth - 10 years 1966 to 1976 - - - 24%

Growth - 10 years 1976 to 1986 - - - 35%

TABLE II

Geary BLVD West of Baker St
Weather:Clear#14710 JC/EK/BC/
East Bound For Shui Ying Wong

HOUR OF DAY	QUARTER HOUR 1st	2nd	3rd	4th	HOUR TOTAL	EACH * REPRESENTS 90 VEHICLES A DASH MEANS HOUR VOLUME < 45
12 AM	131	90	82	62	365	****
1 AM	45	43	48	38	174	**
2 AM	48	35	29	32	144	**
3 AM	31	15	26	25	97	*
4 AM	25	24	36	32	117	*
5 AM	48	72	104	130	354	****
6 AM	166	202	301	387	1056	**********
7 AM	396	504	608	647	2155	************************
8 AM	627	642	554	581	2404	**************************
9 AM	483	519	423	442	1867	*********************
10 AM	411	404	402	361	1578	******************
11 AM	411	420	392	405	1628	******************
12 PM	360	397	394	420	1571	*****************
1 PM	398	402	363	429	1592	******************
2 PM	400	424	408	421	1653	******************
3 PM	468	458	416	426	1768	********************
4 PM	420	386	427	408	1641	******************
5 PM	455	456	432	370	1713	*******************
6 PM	419	369	435	387	1610	******************
7 PM	336	338	284	272	1230	**************
8 PM	247	239	229	245	960	**********
9 PM	270	240	225	246	981	**********
10 PM	254	214	183	224	875	**********
11 PM	162	147	137	115	561	******

TOTAL VOLUME IS 28,094 VEHICLES.

PEAK HOURS:
MORNING PEAK HOUR VOLUME OF 2,524 BEGINS AT 7:30 AM (9 %)
EVENING PEAK HOUR VOLUME OF 1,768 BEGINS AT 3:00 PM (6 %)

DATA COLLECTION BEGAN AT 10 am ON THURSDAY,NOVEMBER 20, 1986.

TABLE III

Geary BLVD West of Baker St
Weather:Clear#8531 JC/EK/BC
West Bound For Shui Ying Wong

OUR F DAY	QUARTER HOUR 1st	2nd	3rd	4th	HOUR TOTAL	EACH * REPRESENTS 86 VEHIC A DASH MEANS HOUR VOLUME <
2 AM	130	104	109	100	443	*****
1 AM	68	63	63	55	249	***
2 AM	78	73	37	40	228	***
3 AM	28	14	15	23	80	*
4 AM	27	16	16	27	86	*
5 AM	23	26	34	57	140	**
6 AM	61	101	113	159	434	*****
7 AM	171	182	231	265	849	**********
8 AM	260	272	225	237	994	**********
9 AM	290	285	275	305	1155	**********
0 AM	288	338	339	329	1294	**********
1 AM	348	355	336	351	1390	**********
2 PM	380	396	370	378	1524	**********
1 PM	385	374	384	378	1521	**********
2 PM	403	422	419	471	1715	**********
3 PM	447	482	492	479	1900	**********
4 PM	492	492	525	529	2038	**********
5 PM	584	619	613	583	2399	**********
6 PM	489	514	471	478	1952	**********
7 PM	406	364	358	329	1457	**********
8 PM	320	284	290	268	1162	**********
9 PM	255	358	280	320	1213	**********
.0 PM	252	261	196	223	932	**********
.1 PM	260	196	182	160	798	*********

TOTAL VOLUME IS 25,953 VEHICLES.

PEAK HOURS:
MORNING PEAK HOUR VOLUME OF 1,390 BEGINS AT 11:00 AM (5 %)
EVENING PEAK HOUR VOLUME OF 2,399 BEGINS AT 5:00 PM (9 %)

DATA COLLECTION BEGAN AT 10 am ON THURSDAY,NOVEMBER 20, 1986.

TABLE IV

VEHICLE COUNTS ON GEARY BLVD

CITY & COUNTY OF SAN FRANCISCO
TRAFFIC ENGINEERING DIVISION

Str 4631

DAY & DATE*	Thur 4/24 .1986	Thur 4/24 .1986	1986	1986
WEATHER & MISC.	Sunny 8535	Sunny 14692		
DIRECTION	EAST BOUND	WEST BOUND	EAST BOUND	WEST BOUND
LOCATION	W of 16th Ave	W of 16th Ave		
PERIOD ENDING	VEHICLES COUNTED			
FULL HR 8 AM	1195	488		
9	799	669		
10	932	683		
11 AM	891	773		
NOON	862	915		
1 PM	938	947		
2	946	870		
3	990	959		
4	1020	1041		
5	923	1201		
6	909	1369		
7	970	1245		
8	823	1045		
9	695	799		
10	667	755		
11 PM	546	662		
MIDN	354	464		
1 AM	182 ↓	249 ↓		
2	86	152		
3	75	128		
4	39	53		
5	77	52		
6	178	79		
7 AM	578	227		
24-HR.	15675T	15825T		
1/4 HR. 7:15 AM	229	82		
:30	287	112		
:45	344	131		
8:00	335	163		
:15	325	170		
:30	273	177		
:45	102	152		
9:00 AM	99	170		
1/4 HR. 4:15 PM	244	300		
:30	207	295		
:45	242	296		
5:00	230	310		
:15	248	312		
:30	233	362		
:45	209	343		
6:00 PM	219	352		

* Horizontal Bar on Arrow "↓" Identifies Beginning Of Count On Date Shown At Head Of Column.

4. URBAN PLANNING ISSUES AND DEMOGRAPHICS

The Master Plan of the City and County of San Francisco, required by State law, specifies seventeen elements, one of which is a transportation plan. In the San Francisco Master Plan, Geary is specified as both a transit preferential street and a rapid transit corridor. Geary is also a major automobile thoroughfare. Consequently, one of the problems that concerns the Department of City Planning is how the two functions would be segregated if LRT is chosen. City Planning recognizes, though, that one of the advantages of light rail is that it is highly versatile and can function in a variety of situations.

Only two City Planning studies have been done recently concerning the corridor. These are the Neighborhood Commercial Rezoning Study and the Neighborhood Parking Plan. As a result of these studies, Clement Street was recently down-zoned and has also been identified as the area of the City most in need of parking.

The Richmond District has a residential density of 30 to 45 people per acre, ranging from 30 people per acre near the Beach and increasing inland. Further east, Geary between Van Ness and Powell has a density of 110 per acre. This compares with 20 to 25 in the outer portions of the Sunset District served by the N-JUDAH, 50 per acre in the Haight, and 130 to 140 per acre in Chinatown, the most densely populated area of the City. Densities along Geary generally tend to be higher than those along the existing N-JUDAH light rail line.

Demographics

Table V shows demographic trends from 1970 to 1980 in the Geary corridor with respect to housing units and population.

In the area from Powell to Gough, there was an increase in households without autos, although autos per household remained constant. (See Table 5 and Figures 1 and 2.) There was also a greater use of transit and less use of autos for commuting.

In the area from Gough to Arguello, there was a greater use of transit and less use of autos for commuting, but no significant change overall in auto ownership rates during the same time period. (An exception was noted in Census Tract #153 [Steiner to Baker, Sutter to California], with a big drop in no-auto households and a rise in autos per household).

In the area from Arguello to the Great Highway, there were fewer no-auto households and sizable increases in autos per household, but generally, no notable overall change in auto or transit shares for commuting. (Only two exceptions noted: Tract #401 [more transit] and Tract #477 [more autos] which moved in opposite directions.)

Generally, there is a large portion of households in the corridor which do not have autos. Though auto ownership has been increasing, transit use has not been declining as would "normally" be expected with an increase in auto ownership. (This contrasts with what is "normal" in much of the country.) Other factors, such as the limited supply and the cost of parking, as well as, the availability of good transit, seem to predominate. To a significant extent, San Franciscans use transit for commuting and the auto for recreation.

TABLE V

GEARY CORRIDOR
POPULATION AND HOUSING UNITS TRENDS

	Population			Housing Units		
	1980	1970	Change	1980	1970	Change
Powell-Gough	12,804	13,218	- 414	10,172	11,320	-1148
Gough-Arguello	30,583	34,620	-4037	15,810	15,149	+ 661
Arguello-Great Hwy	61,123	61,675	- 552	26,835	24,955	+1880
Total Corridor	104,510	109,510	-5003	52,817	51,424	+1393

Source: Bill Wycko of the Transportation Section of the Department of City Planning

Geary Corridor: Population and Transportation Characteristics

Census Tract	1980 Population	1980 Population Density	1980 Housing Units	1980 Housing Density	1980 Households w/No Autos	1980 Avg. Auto/ Household	1980 JTW % Auto	1980 JTW % Transit	1970 Population	1970 Pop Density	1970 Housing Units	1970 Housing Density	1970 Households w/ No Autos	1970 Avg. Auto/ Household	1970 JTW % Auto	1970 JTW % Transit
123	5070	110.22	4148	90.174	78.6%	0.11	9.3%	42.0%	5023	109.20	4865	105.76	74.4%	0.12	11.2%	29.3%
122	5095	110.76	4121	89.587	81.2%	0.13	9.4%	57.7%	5139	111.717	4192	91.13	78.0%	0.15	12.3%	44.2%
151	1393	31.659	936	21.273	55.3%	0.41	23.4%	56.7%	1520	34.545	1071	24.341	50.5%	0.49	29.5%	50.6%
160	1246	31.15	967	24.175	54.3%	0.46	37.2%	41.6%	1536	38.4	1192	29.8	46.7%	0.44	37.8%	29.3%
159	2243	31.592	1145	16.127	41.5%	0.69	36.9%	42.9%	2543	35.817	1186	16.704	30.9%	0.71	47.6%	28.6%
155	2539	31.346	1373	16.951	58.8%	0.41	26.7%	43.1%	2770	34.198	1352	16.691	58.6%	0.36	41.9%	40.0%
153	2045	35.259	1018	17.552	26.0%	0.86	39.7%	40.8%	2533	43.672	1088	18.759	50.6%	0.57	28.3%	43.8%
152	3513	50.913	2245	32.536	36.3%	0.68	32.4%	46.2%	3851	55.812	1921	27.841	38.2%	0.67	34.1%	46.7%
158	5866	46.556	3274	25.984	43.5%	0.55	37.2%	54.1%	7464	59.238	3405	27.024	46.7%	0.54	45.4%	45.4%
157	6268	30.725	2462	12.069	24.2%	0.96	37.1%	42.9%	6841	33.534	2307	11.309	27.6%	0.89	46.7%	34.6%
154	5422	30.291	2964	16.559	27.4%	0.94	43.8%	41.4%	5853	32.698	2645	14.77	26.1%	0.91	52.0%	38.7%
156	2687	37.845	1329	18.718	25.8%	0.98	47.7%	41.9%	2765	38.944	1245	17.535	22.8%	0.95	63.1%	30.7%
401	4326	42.0	1953	18.961	29.9%	0.92	36.1%	48.4%	4501	43.699	1792	17.398	33.2%	0.83	46.7%	36.9%
451	4762	50.66	2079	22.117	26.9%	1.01	42.1%	45.1%	4739	50.415	1842	19.596	31.5%	0.79	44.0%	43.2%
452	6403	43.856	2702	18.507	29.8%	0.99	45.2%	46.2%	6881	47.130	2648	18.137	33.6%	0.80	41.1%	46.4%
402	5254	39.209	2443	18.231	28.0%	0.90	39.4%	46.9%	5350	39.925	2275	16.978	38.6%	0.67	43.6%	48.1%
476	5535	42.907	2237	17.341	22.1%	1.07	52.3%	40.5%	5723	44.364	2119	16.426	26.7%	0.92	52.3%	40.3%
426	7065	45.288	3189	20.442	28.1%	0.99	46.3%	42.9%	6859	43.968	2835	18.173	32.3%	0.80	46.6%	42.7%
427	4761	46.223	2244	21.786	27.2%	0.96	48.8%	44.4%	4588	44.544	2032	19.728	28.2%	0.84	49.4%	43.8%
477	7711	43.813	3287	18.676	21.0%	1.09	53.4%	40.8%	7587	43.108	3076	17.477	30.1%	0.84	46.3%	44.3%
478	6918	34.418	2923	14.542	25.7%	1.06	54.0%	39.1%	6946	34.557	2750	13.682	20.3%	1.00	55.1%	38.6%
479	8388	23.43	3778	10.553	18.4%	1.13	53.9%	40.2%	8501	23.746	3586	10.017	22.6%	0.98	53.2%	40.8%

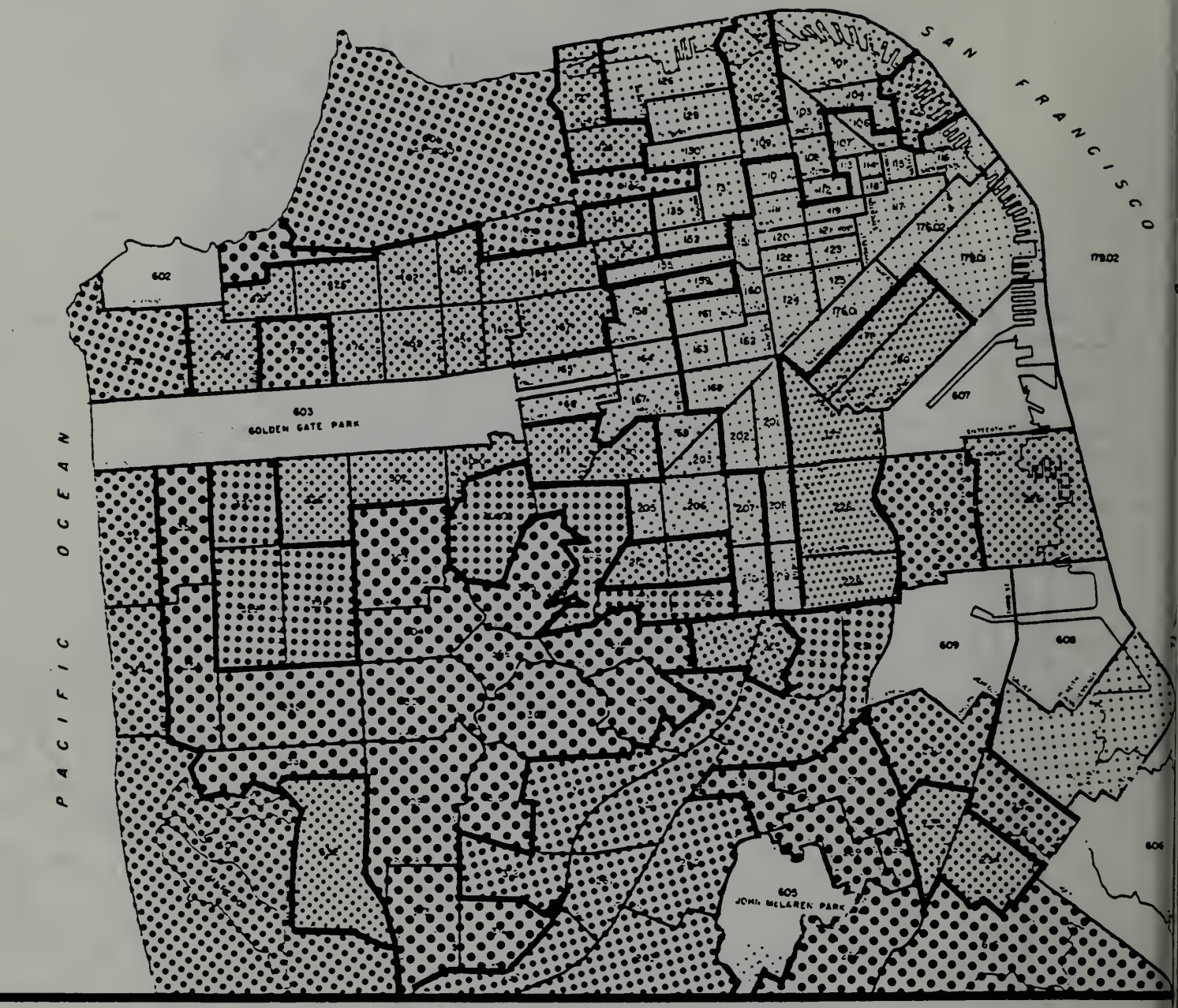
Source: U.S. Census, 1980: Tables P-1, H-1 and H-7; and 1970: Tables P-1, P-2, H-1 and H-2. Census tract boundaries were unchanged in the Geary Corridor between 1970 and 1980.

Population and Housing densities are computed on a per acre area basis. JTW equals journeys to work by all workers including walk and work at home.

FIGURE 2

1980 CENSUS TRACTS

FIGURE 3



CAR OWNERSHIP PER HOUSEHOLD _ Census 1980

CARS

- 1.31 +
- 1.11 _ 1.30
- .91 _ 1.10
- .61 _ .90
- .10 _ .60

5. FINANCE

The most exciting new source for transportion funding is a ballot measure for a transportation sales tax increase which has been placed on the November 1989 ballot. This option exists as a result of state legislation and requires a simple majority to pass rather than the usual two-thirds majority. A key legal requirement which must be met in order for the Board of Supervisors to place a transportation sales tax on the ballot is to have a specific list of transportation projects, either road or transit, to be funded with the tax. The tax is for a specific time period and can be used to finance a bond issue or to pay the operating costs for new service.

Legislation to form a Task Force to prepare a sales tax proposal was passed by the Board of Supervisors and signed by the Mayor in May of 1988. Subsequently, a "Transportation Committee" was formed to implement the legislation. The Transportation Committee has completed its process of assessing the city's long range transportation capital needs and possible funding sources including a sales tax, gas tax, or other. The new committee discussed City-wide needs which included balancing the needs of the Geary corridor against other needs in the City. In addition to transit projects, roadway needs were also evaluated partly as a result of the fact that the city cannot obtain adequate funds for street repairs from the state gas tax under the existing allocation formulas.

The Transportion Committee was made up of the five members of the Public Utilities Commission, the Director of the Department of Public Works, and the Director of the Department of City Planning, thereby involving the three City departments most closely concerned with transportation. There was also a 55 member Citizen's Advisory Committee, composed of interested citizens, and a Technical Advisory Committee, made up of key staff from the City departments concerned.

The sales tax, if passed, is expected to raise $902 million over 20 years. The funds are to be allocated as follows:

Transit	60%
Streets and Traffic Safety	30%
Paratransit	8%
Transportation Systems Management	2%

Of the $541 million allocated to transit, $200 million would be available for planning studies and capital for transit projects in the Geary and Bay Shore corridors of San Francisco.

Other funding sources are listed in Table VII. The development fees, gas tax, and sales tax accrue annually and can be used to retire revenue bonds in order to raise the capital needed to build a project immediately in anticipation of sales tax revenues. At present, about one third of the development fee revenues are under litigation. About $35 million is now available over 30 years, i.e., $2.5 million per year. This could increase to $80 million (present value). The gas tax would be a local tax. The voters have already approved a 1¢ per gallon local gas tax in 1980; however, the tax was never levied by the Board.

The BART funds could come as a result of the San Mateo County buy-in to the BART system if BART is extended south of Daly City into San Mateo County. The buy-in money

would be used for BART extensions in the existing BART district which includes San Francisco. The total buy-in, if BART is extended all the way to the airport, could be $200 million, of which, San Francisco's share could be $66 million. Geary has long been identified as a BART priority.

These local funds are usually used to match varying sources of state and federal funding which require minimum percentages of local funding.

San Francisco is now slated to receive only 2% of the rail project funds proposed for the Bay Area despite the fact that San Francisco has 15% of the population and 50% of the transit riders in the region.

There is also about $25 million left in the San Francisco Municipal Railway Improvement Corporation (SFMRIC) fund. (SFMRIC is a non-profit corporation established in the late 1960's which can sell revenue bonds funded by lease payments from the Municipal Railway in order to pay for new or replacement equipment. Some bridge toll money is also used to make lease payments to SFMRIC for vehicle and equipment leases.)

It should be considered, however, that these potential sources of money for transit projects may be optimistic. The Transit Impact Development Fee may be as little as $40 million. The San Francisco share of the San Mateo BART buy-in may be as little $15 million. Also, the assumption that the federal and state governments would match local funds one-for-one may be optimistic as well; presently, the federal government provides $20 to $55 million, and the state provides only $5 million, specifically, $20-25 million from UMTA Section 9 formula grants, $0-30 million from UMTA Section 3 discretionary grants, $0.5 million from Federal Aid Urban highway funds, and $5 million from State Guideway funds. The City is also receiving a one time grant from the Interstate Highway Transfer program by trading in the I-280 freeway extension for various transit and street projects for about $80 million, $30 million of which has been granted. San Francisco gets about one-sixth of the available state money which is now about $75 million statewide. To levy Transit Development Fees, the City must show that increased service is being provided. In the past few years, service to the downtown has been increased about 5%.

On the other hand, despite these constraints on state and federal funding, a Geary LRT project would rank highly compared nationally against other rail projects. However, a $100 million project would require an UMTA Section 3 discretionary grant with an EIR and alternatives analysis which can add several years to the planning and design process.

Most capital projects are highly leveraged, frequently with 0 to 5% of the total funding coming from local match. Some projects in other localities which are less beneficial receive a smaller amount of matching funds from the federal government. Since a Geary LRT line would rank highly against UMTA's standards, the City could expect to receive up to a 75% match of federal funds. UMTA will look at the incremental benefit for each additional dollar (for example, the additional patrons generated by the additional investment for the subway portion).

Simply extrapolating existing low funding into the future could give a misleading and pessimistic picture of funding possibilities from the federal government essentially resulting in nothing being done. For example, if Los Angeles had taken that approach, they would not now be building a starter subway on Wilshire Boulevard or a light rail line to Long Beach. The Wilshire project was opposed by UMTA but funded by Congressional legislation. San Francisco has effective representatives in Congress. The need is for a list of popular projects to be funded.

TABLE VII

REVENUE SOURCES

1. Transit Development Fees (1)	$ 80 million
2. Gas Tax ($2.3 million per year) (2)	27 million
3. Sales Tax	200 million
4. BART	66 million
SUBTOTAL	$ 373 million
50% Federal and State Funding Match	$ 373 million
TOTAL	$ 746 million

Notes:

1. Estimated revenue based on already approved project.

Source: Stephen Taber, Task Force member.

A key issue regarding funding is the substantial difference in cost between an all-surface light rail line and a line with a subway downtown. An all surface project would cost approximately $100 million as compared to $500 million for a combined surface and subway project. For this reason, though there was unanimous support for rail on the Task Force, there was division as to whether to build a subway downtown or build an all surface system.

This difference in potential magnitude of cost can also make a great difference in the time horizon for funding and construction. For example, the Long Beach light rail line, which will be mostly on the surface with a short subway in downtown Los Angeles, will be opened long before a very much foreshortened BART-type subway on Wilshire Boulevard. It has taken 20 years to begin construction of the Wilshire subway, but only 3 years to start the Long Beach line. Light rail, unlike a BART-type of system, can be built partly underground and partly on the surface.

An alternate strategy for funding and building higher cost projects such as subways would be to build in steps in order to spread funding requirements. The first step need not be the final project. For example, a Columbus Avenue subway extension could be added to a Post Street subway later (if the initial subway were built under Post connecting with Geary Boulevard at Gough instead of under Geary downtown). BART and Washington Metro have plans for major extensions.

(The foregoing financial analysis was provided to the Task Force by Steve Taber, a public finance attorney and Task Force member, and by Gayle Bloom of the Public Utilities Commission, Finance Bureau.)

6. TRANSIT MODES

There are numerous types of public transit vehicles and modes and numerous applications of these various modes and vehicles world wide. The principal modes used in San Francisco are motor buses, trolley buses, cable cars, Trolley Festival historic electric streetcars (a form of light rail), and Muni Metro (another form of light rail). Regionally, BART operates what is generally called heavy rapid transit; that is, the tracks are on a completely separated right-of-way consisting of subways, elevated structures, and embankments, as well as, at-grade, fenced right-of-way. The BART cars are similar to rapid transit cars in subways such as New York's or Philadelphia's but are longer than usual and designed for high speeds of 67 to 80 mph for suburban service. Each BART car is powered from an electric third rail next to the running tracks. Caltrain also provides suburban service from San Francisco to the Peninsula and San Jose. These trains are, like BART, designed for speeds of up to 80 mph for suburban service. However, the cars are unpowered, longer, double-decked, towed by diesel locomotives, and operated mostly at grade with crossing gates at street and road intersections. Cars of this type can also be electrically powered like BART cars to provide rapid acceleration and, hence, travel times comparable to BART.

Specialized Modes

Other modes popularly discussed are monorail, maglev (wheel-less, magnetically supported cars), personal rapid transit (a miniaturized, slow, automatically controlled, driverless version of BART), and dual-mode guided buses (buses that can be operated alternately as trolley buses or motor buses and can be steered by a guide-rail system on separate right-of-ways or in tunnels).

The Task Force evaluated these various public transit forms reducing the list by a process of elimination to the most practical and desirable choices for the Geary Corridor. Modes involving elevated structures, such as monorail, maglev, or personal rapid transit, were ruled out as unsightly. Also, these modes require complete grade separation and were ruled out due to the requisite expense of building a subway or an elevated the complete length of Geary. The remaining practical alternatives are then limited to motor buses, trolley buses, a trolley bus downtown subway with mostly surface operation, or light rail with or without a downtown subway.

Motor Bus

It was generally conceded that the existing articulated diesel bus service in the Geary corridor does not provide the comfort, speed, reliability, or capacity required for one of the busiest corridors in the City.

Trolley Bus

The trolley bus was seen as more comfortable, more economical, slightly faster, and environmentally superior to the diesel bus. However, if it were to operate in mixed traffic, the trolley bus would be only a little faster and reliable than the diesel bus, and would not provide needed capacity, service reliability, or efficiency. The feasibility of converting the 38-Geary to trolley bus was in fact been discussed at public meetings two years ago but received only modest support and substantial opposition.

Guided Subway Trolley Bus

The guided subway trolley bus is a system where trolley buses are operated in paved subways, and guide rails parallel to the side of the roadway guide the steering mechanism of the trolley bus, usually through small horizontal wheels on the sides of the buses. On surface streets, the guided trolley buses can be operated as regular trolley buses and steered by the driver. Guideways of this type can also be installed on the surface on separate right-of-ways or on aerial structures much as with BART. The advantage of this system is that, as with light rail, narrower, less costly subway, aerial, or surface guideways can be used than if the vehicle were steered by the driver.

Though a trolley bus subway would improve reliability and speed in the subway portion, it would still operate in mixed traffic in the neighborhoods or require paving of the median for faster surface service. Though operation in the subway would improve speed by a few minutes and, thereby, reduce operating costs by saving one or two coaches, this savings would be cancelled by the need for staffing and maintaining the subway and stations.

A problem with the existing motor bus service on Geary is that the passenger demand and frequency of service are so great that bunching, irregular loading, and wasted capacity are inevitable with buses. Since the articulated trolley coach is the same capacity as the articulated motor coaches now in use, the problems of avoiding bunching and of increasing capacity would remain unresolved even with a guided subway downtown.

Since the major portion of the capital cost of either a light rail or trolley bus with a downtown subway would be the subway, there would be little advantage in terms of initial cost for the trolley bus subway alternative compared to light rail. On the other hand, since light rail vehicles can carry more passengers per vehicle and since light rail vehicles can be operated in trains, the operating cost per passenger would be higher for the trolley bus subway system by comparison to the competing light rail mode.

The guided subway/surface trolley bus generated no interest among the Task Force members.

Light Rail

Despite the fact that light rail operates on a "fixed guideway", the actual range of applications of light rail are extraordinarily flexible. Modern light rail can operate quietly and pollution-free in subways, on aerial structures, in grassy medians of boulevards, in side-of-the-road lanes, in mixed traffic, or on pedestrian malls. Electrically powered, light rail vehicles can very efficiently use power generated from any number of low pollution sources with relative immunity from interruptions of foreign sources of fuel. Since light rail vehicles can be coupled together and operated in trains, they have great flexibility in capacity and can carry large numbers of passengers with the least impact on street space. Train lengths can be adjusted to optimize operations and economy and avoid bunching.

Excellent examples of various operating methods for all-new light rail systems can be found in several cities. In San Diego, two methods of surface trackway construction are used to provide rapid service, out of traffic, at low cost. In the suburbs, a rehabilitated and electrified, freight railroad right-of-way, located away from other traffic is used. In the downtown, a side-of-the-road trackway on city streets with traffic signals timed for transit is used. In Portland, virtually all types of surface

treatments are used including: side-of-the-road track lanes on downtown city streets, transit-only streets, pre-empted access to auto lanes on a two-lane bridge, side-of-the-road in a depressed freeway right-of-way, boulevard median trackway, and a completely separate, converted, freight railroad right-of-way in the suburbs. Some cities that have built new light rail lines use subways on portions of their routes include Edmonton, Buffalo, Pittsburgh, and the planned St. Louis and Los Angeles light rail lines. Many LRT systems, such as Portland, San Diego, Sacramento, Santa Clara, and Calgary do not have subways. Most use more than one type of treatment. All have been very popular.

An outstanding example of operation of light rail in a mall is the Bahnhof Strasse in Zurich, Switzerland. This transit pedestrian street which is restricted to pedestrians and light rail vehicles also has the distinction of having the highest retail rents in the world - a fact that clearly should put to rest any fears that light rail might interfere with business.

In San Diego, patronage has nearly doubled since the opening of the line in 1981 from 11,000 to 21,000 riders per day on the original line to San Ysidro which is across the border from Tijuana, Mexico. In Portland, patronage on the entire transit system increased 6% in the first year of operation of this single, main, east-west light rail line. Patronage on the Portland light rail line alone is 21,000 per day. In Santa Clara, total patronage for transit including both bus and rail in the 1st Avenue corridor, where the light rail line replaced part of the bus service, tripled, though, from a mere 1900 per day to 5900 per day. (Only half the route which connects the central business district of San Jose with a partially developed industrial area is completed at present. The southern half of the route connecting with residential areas is still under construction.) San Diego, Edmonton, and Calgary (in Alberta, Canada) are now building new extensions.

Low-Floor Light Rail Cars The latest light rail designs feature floors as low as 14 inches which permit either convenient one step entry or a level entry from a relatively low loading platform.

Proof-of-Payment Fare Collection A key feature of modern light rail installations in Europe, as well as, all of the new light rail systems in the United States such as San Diego, Santa Clara, Sacramento, or Portland, is proof-of-payment fare collection. With this system, passengers pay their fare before boarding the transit vehicle by purchasing their ticket from a vending machine at the car stop or by purchasing a pass such as a Fast Pass. Passengers are then allowed to board through all doors, cutting loading time dramatically and obviating the need for drivers on all but the first car of trains. All passengers must have a valid ticket or pass as proof of payment, or be subject to being issued a citation in the same manner parking tickets are issued. The proof-of-payment fare collection system greatly improves both the operating speed and economy of light rail operations.

Light Rail on Geary

In these other cities, where there are only one or sometimes two light rail lines with less than half the total patronage of the Geary bus lines, light rail principally serves the purpose of providing a main line, separated from traffic, providing higher speed, acting as a strong patronage magnet, and enhancing the attractiveness of the entire transit system. Light rail then serves much the same purpose as an anchor department store in a shopping mall. By rerouting bus routes to allow patrons to transfer to the light rail line, this main-line anchor effect is further enhanced.

Since these light rail lines are faster and more comfortable than buses and connect with other bus routes, the necessity for many patrons to transfer is outweighed by the advantages to patrons of speed, comfort, and greater connectivity. In other words, any patrons lost because of the need to transfer are more than replaced by new patrons who can reach more destinations, more conveniently than they could before by transit.

In the Geary corridor, the existing Geary bus route already connects with numerous cross-town lines. Patronage is quite high due to these connections, the high population density of the corridor, and the lack of parking space downtown. The resulting patronage of over 50,000 per day results in an average headway (time between buses) of less than three minutes, even with the use of articulated buses. Operating in mixed traffic with a three-minute headway means that a mere delay of one minute causes buses to pick up a third more passengers at each subsequent stop, and buses rapidly fall behind schedule. A mere three minutes of cumulative delay results in buses bunching. This problem of erratic operation and bunching has been somewhat alleviated by dividing the Geary route into four independently operated bus lines: the local, the daytime limited, and the two, rush-hours-only, zoned express routes. This system provides fast, reliable service for over half the riders during weekdays; however, the remaining half of weekday riders and all riders in the evening, weekends, and holidays must ride the slow local buses.

Light rail, by contrast, operating in a median west of Gough Street with partial signal pre-emption and employing some traffic diversion and transit priority or a subway downtown, could provide the same speed as the limited bus, but with local bus stop spacing. An important by-product of replacing both the local and limited with a light rail line would be that it would then be possible to operate the same frequency of service with two-car trains and the proof-of-payment fare collection system at a lower cost per passenger.

Presumably, it should be possible to operate buses faster within a median in the expressway and boulevard segments of Geary and with transit priority downtown. However, a bus median would have to be completely paved; whereas, a rail median can be grassed over and landscaped. Paving the median of Geary is unlikely to be acceptable to either residents or businesses along Geary. Signal pre-emption for buses would result in more interference to other traffic than signal pre-emption for light rail since buses are smaller units, would have to operate far more frequently, and would pre-empt signals more often. Moreover, generating the public interest necessary to install the necessary transit priority measures downtown would be more problematic for buses than for light rail since light rail is generally seen as a more prestigious mode.

Essentially, it is the combination of the following positive attributes rather than any single criterion that the Task Force saw as setting light rail well ahead of other modes: no pollution, low noise, smooth ride, fast operation in a green median, high passenger capacity, low operating cost, and affordable capital cost.

Transit Mode and Development Pressure

A concern that has been expressed by some members of the public is that the installation of a new rail line, which has the inherent ability to easily carry large numbers of passengers, would be growth inducing. In the early days of street railway expansion, new streetcar lines were in fact often built by real estate developers to enhance the value of new housing developments. Without these streetcar lines and extensions, the development of housing tracts that were more than walking distance from the central business districts of larger cities would not have been feasible except in

the case of those for the very wealthy. The auto age and tax subsidized freeways have changed all of this entirely. Since the 1920's, it has only been necessary in most cases for developers to build the basic local street network in the development itself to sell houses.

Growth is induced when the demand for property exceeds the supply. When demand exceeds supply, the price of housing escalates. If housing prices rise enough, the value of higher density housing will exceed the expense of tearing down existing housing and replacing it. This condition clearly exists at present in the Geary corridor with bus transit alone. The value of property in the Geary corridor is a function primarily of the proximity of the corridor to downtown San Francisco, northern California's principal financial and business center, as well as, the quality of the housing stock in the corridor, and the quality of the surrounding neighborhoods. This growth inducing situation can be restrained only by lowering the quality of the neighborhood, by very substantially reducing the speed, comfort, or economy of transportation, or by imposing zoning restrictions.

In the Geary corridor, the high level of transit usage is a result of the limited availability and the high cost of parking, both in the downtown and in the residential areas, as well as, high population densities throughout the corridor, rather than the cause of high densities. This high level of transit usage requires frequent transit service at all hours which in turn attracts more riders and so forth resulting in excellent service. This favorable patronage situation also leads to the opportunity to economically improve service further with capital investments.

Some attempts have been made to alter travel access in the Geary corridor. Ten years ago, a project which placed various diverters and impediments to auto travel in intersections in the Richmond was attempted but proved very unpopular and was abandoned. A proposal to implement a light rail line in a subway to 17th Avenue was also rejected in 1975. The transportation system has then remained the same for three decades. Despite this fact, pressures for development have increased regardless, and in the mean time, travel continues to be uncomfortable, crowded, and slow on noisy, odorous diesel buses.

Zoning restrictions, on the other hand, have been quite effective in containing growth in the City even though housing values have continued to rise as a result of numerous growth factors. Increased national population, the expansion of economic activity in northern California and the central business district of San Francisco, and increases in congestion on suburban freeways, which in turn makes living in the City increasingly desirable, have all contributed to upward pressures on property values. However, despite these growth pressures, examples such as the Mission District, illustrate the effectiveness of zoning restrictions. In the Mission District, despite the introduction of BART, providing direct, express subway service to downtown and the eastbay, densities have not increased.

With effective zoning controls, light rail would not then be growth inducing, but rather, would be an enhancement to the quality of life for corridor residents. Light rail would instead provide an attractive alternative to the automobile by reducing noise and air pollution from buses and autos, alleviating auto congestion, and decreasing auto accidents and injuries. For these reasons, the Task Force believed that the true issues were quality of life issues related to transportation rather than growth issues.

7. LIGHT RAIL TREATMENTS ON CITY STREETS

A major accomplishment of the Task Force has been the selection from a wide variety of types of light rail treatments of a fairly narrow range of treatments that would be most appropriate for the Geary Corridor. Providing an effective set of transit priority treatments for light rail is important for the reason that even though light rail requires only a relatively moderate capital investment, the cost is still several times greater than for a simple bus route. To make best use of such a capital investment, the Task Force concluded that special transit priority treatments are in order.

Several types of operating systems for light rail are feasible ranging from side of the road reservation to center reservation to full subway. At the same time, there are striking physical differences between different sections of the Geary corridor, ranging from broad boulevards of varying widths in the neighborhoods to the narrow streets of the downtown. The Task Force, however, was able to reduce the choices to one basic set of treatments west of Gough. East of Gough, where the streets narrow, the basic question was whether to operate on the surface with an array of complimentary transit priority techniques or to by-pass the exigencies of street running and operate in a Muni Metro style subway. The Task Force narrowed the range of alternatives for the downtown, but was split between a highly reliable but expensive subway and a very cost effective but more delay prone surface transit priority treatment.

- Existing Conditions on Geary -

The Geary Corridor consists of three basic segments:

Downtown

The downtown portion of Geary is relatively narrow. The curb to curb width between Market Street and Mason Street is 39 feet 9 inches with two traffic lanes. The curb to curb width between Mason and Gough is 44 feet 9.5 inches with room for three narrow 9-foot traffic lanes.

The Expressway

This segment begins west of Gough with an expansive 127 foot, 8 lane, right-of-way to Divisadero where it narrows to a 101-foot right-of-way with 6 lanes from Divisadero to Collins. The expressway portion is broken by a 6-lane underpass under Fillmore Street and a 4-lane one block long automobile subway under Presidio Avenue and Masonic Avenue.

The Boulevard

This segment which extends west of Collins is 99 feet wide with room for 6 lanes except between Park Presidio Boulevard and 27th Avenue where diagonal parking limits the street to 4 traffic lanes.

Parking is provided all along Geary on both sides of the street except at bus stops.

The expressway and the boulevard sections are very similar; each incorporates a 14-foot landscaped median and broad, freeway-standard, 12-foot wide traffic lanes.

The generous width of the expressway and boulevard segments of the street allow for a number of different treatments which could accommodate smooth fast operation of light rail on Geary. The narrow downtown sections require either somewhat specialized transit priority techniques or a subway to provide fast, reliable, light rail service. The underpasses under Fillmore and Masonic also require special attention; however, workable treatments were identified for these special cases.

- Light Rail on City Streets -

Three basic treatments have been used by various transit systems to accommodate light rail on city streets or boulevards:

Median

With this treatment, the tracks are located in separate dedicated lanes or a median. The median can be either simple open-track with exposed ties and gravel, landscaped, or grassed-over. Loading can be either from islands at the side of the median or from center islands located between the tracks. Examples of median operation in San Francisco are the Judah Street raised concrete median (9th to 19th Avenues) and the 19th Avenue open-track median from Eucalyptus to Junipero Serra. Examples of grassed-over track can be found in New Orleans and various European cities. A grass-track median would look like any other grassed median seen on many boulevards in this country.

Mixed Traffic Center Lane

The tracks are located in the center two traffic lanes of the street in pavement with autos allowed on the track. If the street is wide enough, center operation avoids conflict with opening doors of parked cars, double-parked trucks, and right-turning autos. If a wide enough dividing median is available, the median can serve as a passenger loading island, obviating the need for an island to the right of the track lane. Examples in San Francisco of mixed traffic operation are Taravel Street with two wide traffic lanes and Ocean Avenue with 4 traffic lanes.

Since the implementation of a light rail line involves an addition to the street, certain trade-offs are available depending on the conditions existing for each section of a corridor. For example, placing tracks in existing traffic lanes involves the least change. Light rail vehicles would be able to move with less delay by staying in the traffic lane at all times instead of pulling to the curb to load; the trade-off would then consist of exchanging faster movement of transit for slightly slower auto traffic flow. Separating light rail lanes from traffic lanes, on the other hand, involves trading increased transit speed for street space.

Side-of-the-Road

With the side-of-the-road treatment, the tracks are placed in either mixed traffic lanes or a separate rail-only right-of-way to the side of the auto roadway. A single track can be provided on each side of the roadway, or both tracks can be provided next to each other on just one side of the street. The rail right-of-way can be located next to the curb in place of a parking lane or between the sidewalk and the parking lane.

There is a short example of side-of-the-road treatment on Ocean Avenue just west of San Jose Avenue. Side-of-the-road treatments for light rail are quite common in Europe.

Side-of-the-road treatment has the advantage, with the removal of a lane of parking, of providing room for a separate transit right-of-way where the street is otherwise too narrow for both a separate transit right-of-way and automobile traffic lanes. One disadvantage of this treatment can be reduced sight-distance for cross traffic at intersections, especially where there are buildings close to the curb. Another problem is close proximity to pedestrians. This problem, however, can be ameliorated by use of a safety margin of a few feet and possibly a fence between the rail right-of-way and sidewalk.

FIGURE 4

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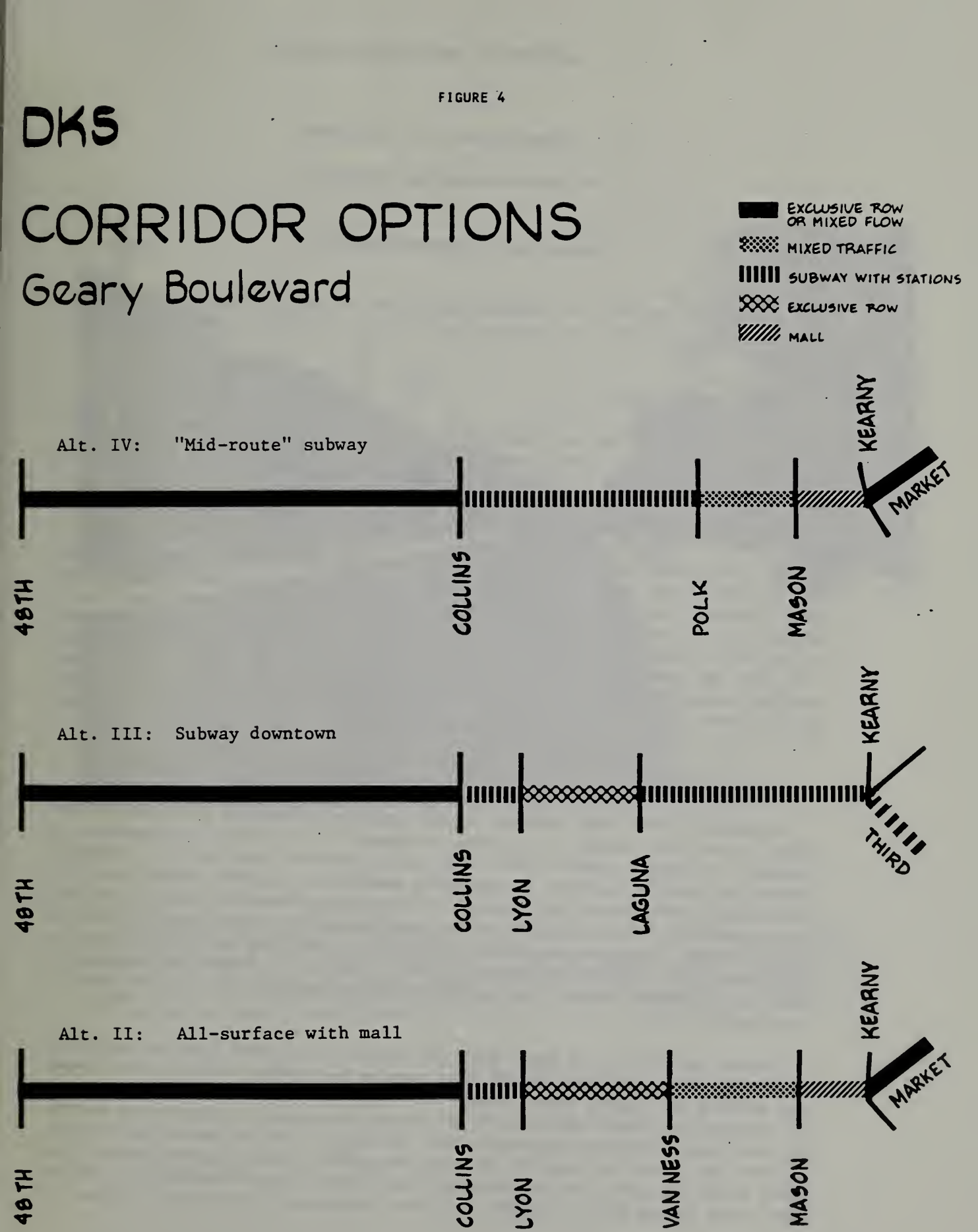
CORRIDOR OPTIONS

Geary Boulevard



8. ALTERNATIVE LIGHT RAIL TREATMENTS ON THE GEARY EXPRESSWAY AND BOULEVARD

- Alternatives & Trade-offs Examined -

On the wider, roomier, less congested expressway and boulevard sections of Geary, the following alternatives for providing rail transit operation were evaluated by the Task Force:

Mixed Traffic Operation

Mixed traffic operation would leave the median unchanged at the same width but use the median as a loading island at stops. Loading from the median would, incidentally, free space now used for bus stop zones for use as parking spaces.

Converting Traffic Lanes to Transit Lanes

The alternatives of converting traffic lanes to transit lanes would involve expanding the center median to approximately 34 feet in width to accommodate tracks, median loading islands, and landscaping. This alternative of course would result in a substantial loss of auto traffic capacity west of Divisadero where the Expressway narrows from 127 feet to 101 feet and from 8 lanes to 6 lanes. However, since the peak load point for automobile traffic is at Lyon Street, one of the four lanes in each direction between Gough and Divisadero could be removed without significantly impacting overall traffic capacity on this segment. It should be noted that there is no more traffic on this segment than at Lyon where the street is two lanes narrower.

Narrowing Traffic Lanes

Narrowing traffic lanes to about 10 feet would be accompanied by increasing the width of the center median from 14 feet to between 21 and 24 feet to accommodate a trackway. The center median tracks would be grassed-over with some low shrubbery between the tracks to maintain an attractive appearance. Passenger loading would be from islands located between the tracks. On the segment between Park Presidio and 28th Avenue, where there is now diagonal parking, parallel parking would be provided opposite loading islands. Light rail tracks and traffic lanes would weave at these locations to accommodate 7-foot wide median islands. Where there is now parallel parking, there would be no parking opposite the loading islands on one side of the street due to limited street width.

Parking trade-offs would vary. Since two-car trains would most likely be needed for optimal operations, the length of red zones opposite the loading islands would be longer than existing bus loading zones. However, since the loading islands would be between the tracks serving both directions with one island, the number of islands would be only half the number of existing bus stops. Thus, the number of parking spaces overall would be about the same as at present. In areas where there is now diagonal parking, the number of parking spaces may increase since there would be room for new parallel parking opposite the islands while the number of diagonal parking would remain about the same.

FIGURE 5

The Task Force preferred treatment for light rail on Geary Boulevard west of Gough is to narrow the existing lanes, widen the median, and place the tracks in a grassed median. A bonus from placing the trackway in its own median is the elimination of traffic conflicts between autos and transit vehicles pulling in and out of stops in mixed traffic. The grassed median shown above once included tracks for the Key System "H" line on Sacramento Street in Berkeley.

Trading Parking Lanes for Transit Lanes

The alternatives of removing parking lanes would involve expanding the center median to approximately 34 feet in width to accommodate tracks, median loading islands, and the existing center landscaping. Alternatively, removing parking lanes could accommodate side-of-the-road running leaving the 14-foot median and existing traffic lanes intact.

- Fillmore Underpass Treatments -

The range of alternative treatments using surface alignments are more limited at the Fillmore underpass section than elsewhere on the street. The overall width of the underpass does not provide adequate space to simply narrow the traffic lanes and expand the median for a light rail trackway. The following alternatives for the Fillmore underpass examined by the Task Force would be feasible.

Alternatives:

1. Traffic Lane Removal The removal of a traffic lane in each direction for a light rail median would work well if accompanied by the removal of a traffic lane in each direction on the Geary Expressway between Gough and Divisadero. Loading would be from a slightly widened center median with access to Fillmore Street by elevator or escalator.

2. Lower Level Subway A new grade separation for one direction of auto traffic at a lower level would provide room for separate light rail lanes on one side of the existing underpass. This new grade separation would be four blocks long and costly.

3. Mixed Traffic Light rail would operate in mixed traffic in the center two lanes. Loading would be from the center median. Traffic signals would be timed and pre-empted to admit light rail trains to the underpass at Webster, westbound, or at Steiner, eastbound, on a separate phase allowing light rail vehicles to stop and load in the underpass between platoons of automobiles.

4. Elevated Center Lanes Elevation of the center two lanes of Geary to the street level at Fillmore for light rail only would obviate the need for passengers to climb stairs or take an elevator or escalator to street level at Fillmore. This alternative would work well with the removal of a traffic lane in each direction on the Geary Expressway between Gough and Divisadero. Fillmore traffic would be pre-empted by the light rail vehicles.

- Masonic Subway Treatments -

The feasible treatments at the Masonic auto subway are similar to those for Fillmore with the exception that, since there are only four traffic lanes, the elimination of two traffic lanes for a light rail median is probably not as feasible. The feasible alternative light rail treatments for Masonic examined by the Task Force are:

Alternatives:

1. Lower Level Subway A new grade separation for one direction of auto traffic at a lower level would provide room for separate light rail lanes on one side of the existing subway. This new grade separation would be six blocks long and costly.

2. Mixed Traffic Light rail would operate in mixed traffic in the center two lanes of the subway. Loading would be from the center median. Traffic signals would be timed and pre-empted to admit light rail trains to the subway at Lyon, westbound, or at Wood, eastbound, on a separate light rail-only phase between platoons of autos with timing to allow light rail vehicles to stop and load in the subway between the platoons of automobiles. This timing is possible since signals are timed along Geary to allow vehicles to flow along the street in groups or platoons with a minimum of red lights.

   Signal timing and pre-emption would be simpler at Masonic than at Fillmore since there is no cross traffic or signalization at either Wood or Lyon at present. By placing a loading island west of Wood for eastbound light rail trains and east of Lyon for westbound light rail trains, the pre-emptions for light rail can be timed to admit light rail into the subway between platoons of autos. That is, light rail vehicles would stop to load on a green light for Geary auto traffic at Wood or Lyon and proceed on a special phase when the light is red for autos. This timing would minimize delay to autos for either direction when light rail trains are loading at the Masonic tunnel stop.

* * Task Force Preferred Alternative * *

Landscaped Expressway and Boulevard Median With Narrowed Lanes

Maintain Curb Parking and Existing Traffic Lanes

Removing parking in order to maintain existing lanes and lane widths while providing a separate right-of-way for light rail was not recommended by the Task Force. There were also reservations concerning the reductions of traffic lanes and, thereby, the reduction of auto capacity.

Grassed Median

The most acceptable treatments were viewed to be either mixed traffic operation or median operation with lane narrowing. The concept of placing the track in the median with narrowed traffic lanes with grass planted over the tracks for landscaping was preferred. The planting of more trees and planters along the sidewalk - where the people are - was considered a reasonable trade for reduced landscaping in the median. The use of a center loading island in the median between the tracks was also favored.

Fillmore and Masonic

The Task Force was satisfied that workable alternatives were available for the Fillmore and Masonic underpasses. However, due to the need for more information on costs and operational feasibility of the alternatives, the Task Force did not adopt a specific preferred alternative for these special situations.

FIGURE 6

This is an example of a grassed median complete with tracks and an old-time streetcar still in operation in New Orleans on the St. Charles line. This line operates through a posh neighborhood and is wide enough for tree plantings. The portion of Geary Boulevard between Gough and Divisadero is wide enough to allow for six traffic lanes, trees, and other landscaping, as well as a grassed trackway.

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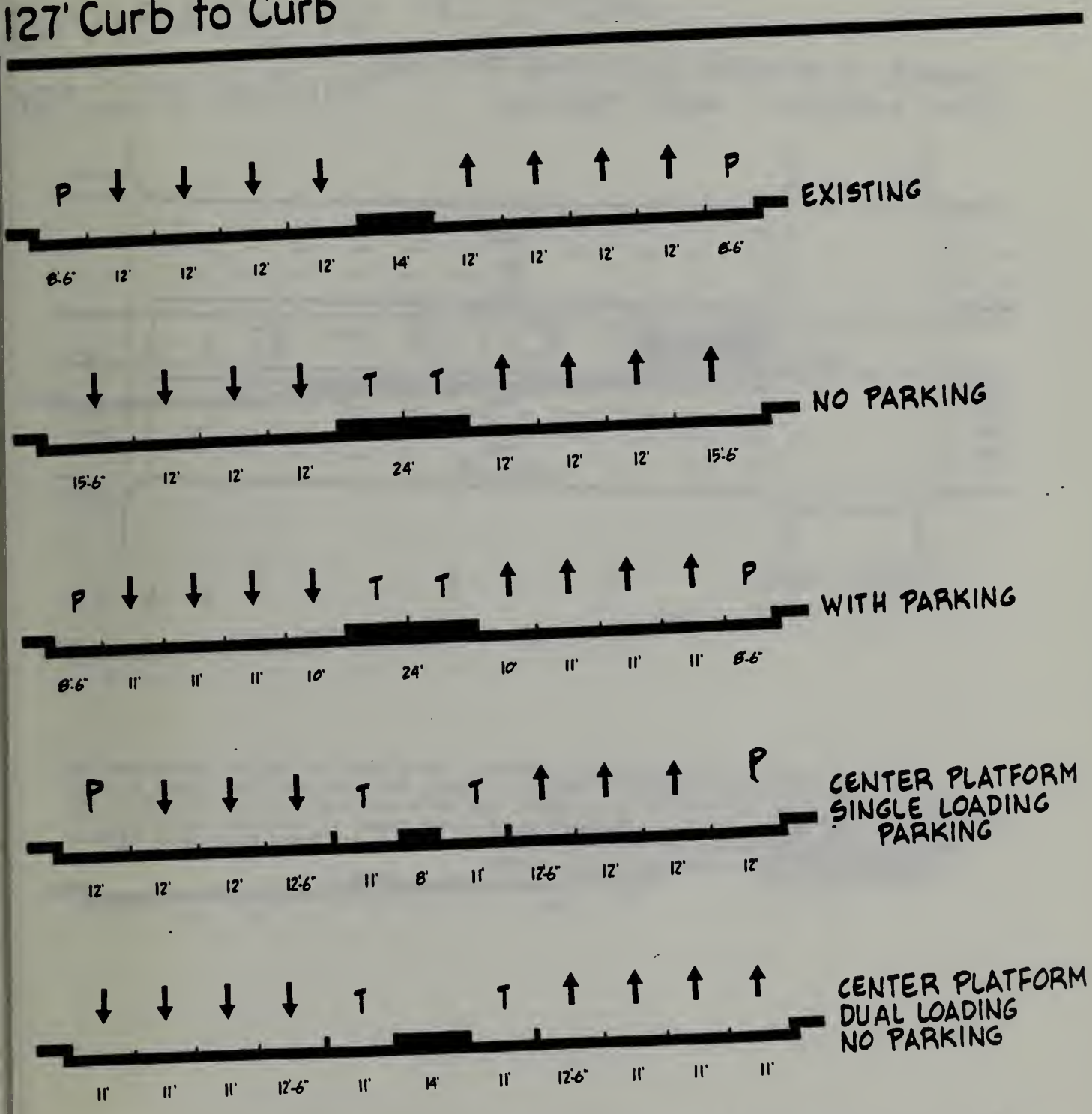
FIGURE 7

GOUGH TO SCOTT (Expressway Alternatives)

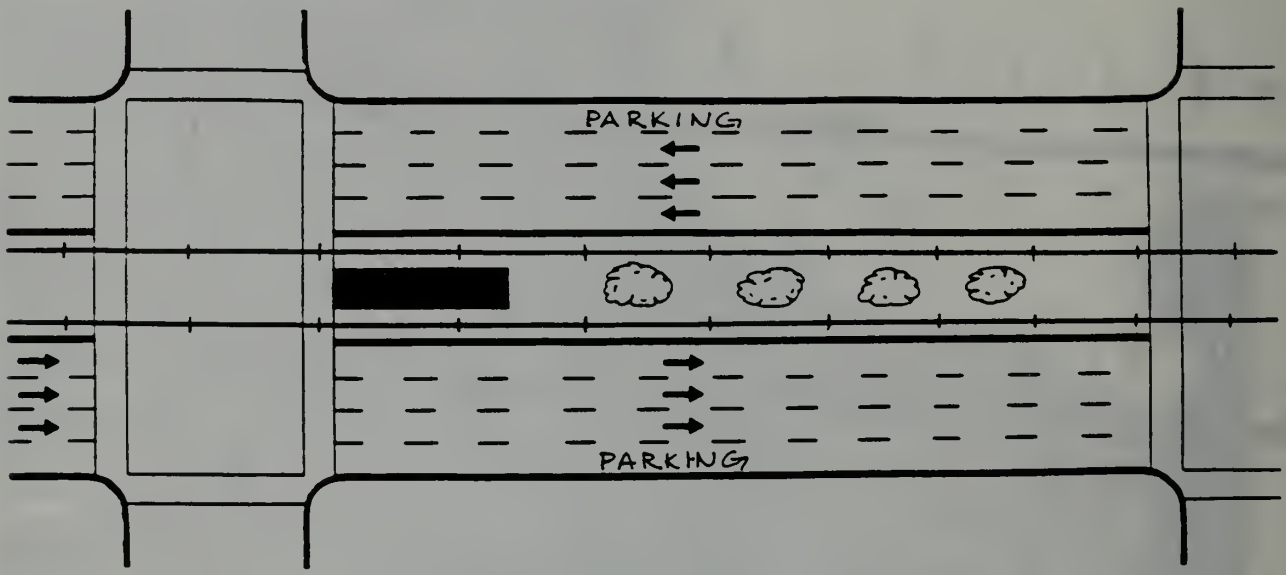
127' Curb to Curb



A separate median for light rail vehicles can be created on this section by either removing a traffic lane in each direction, removing parking, or simply narrowing lanes. On this very wide section of Geary, a very wide, landscaped median for light rail could be created by converting two traffic lanes to grassed trackways adjacent to the existing landscaped median. Loading can be accommodated for both directions from a single loading platform located between the tracks. If the existing number of traffic lanes are retained, space for the wider median required at loading islands could be created by removing some parking or by narrowing the traffic lanes.

FIGURE 8

CENTER PLATFORM (127' CURB TO CURB)
DUAL LOADING - WITH PARKING



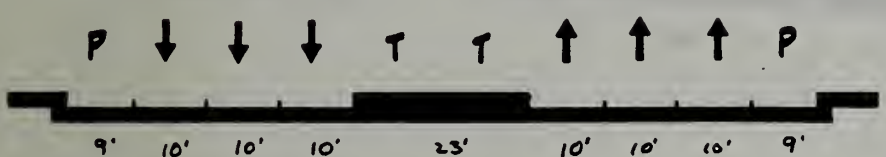
Above is a plan view of the widest section of Geary with the existing median and two traffic lanes converted to grassed trackways. Since the peak auto flow occurs at Lyon Street where there are only six lanes total, the two extra lanes here can be turned over to light rail and landscaping. However, the existing number of lanes can be retained by narrowing both the median and the traffic lanes. Incidentally, this plan would increase parking since the bus zones would not be needed.

FIGURE 9

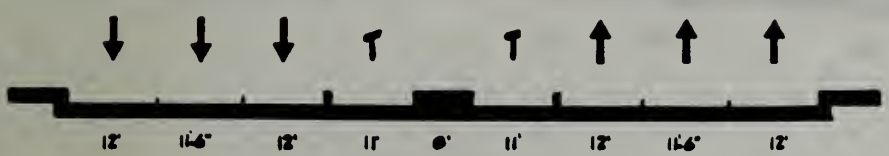
DIVISADERO TO LYON

101 Curb to Curb

EXISTING



GRASS MEDIAN
WITH PARKING



CENTER PLATFORM
SINGLE LOADING
NO PARKING

Where the boulevard narrows, space for a light rail median could also be provided by removing a lane in each direction, removing parking, or narrowing the existing lanes. Narrowing lanes to provide a median while retaining parking was favored by the Task Force. Similar treatments are feasible for the segment between Masonic and Park Presidio Boulevard which is 99 feet wide and also has parallel parking.

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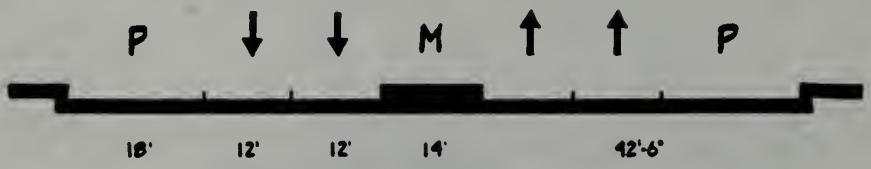
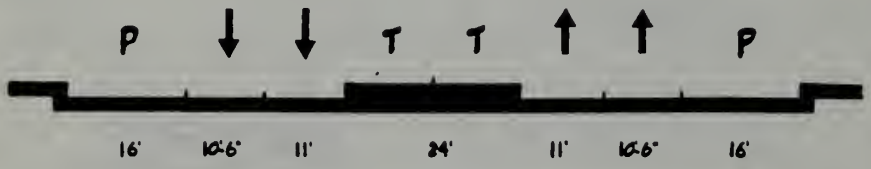
FIGURE 10

14TH TO 27TH AVENUE

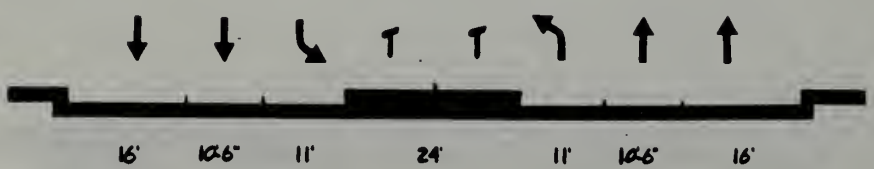
99' Curb to Curb



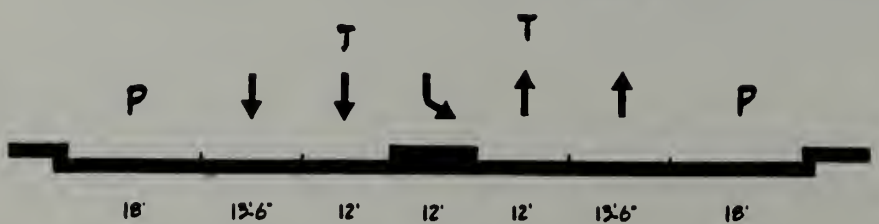
EXISTING



CENTER WITH PARKING
FLAT 40° (8×16 STALLS)
OR PARALLEL



CENTER - NO PARKING
AT INTERSECTION



MIXED FLOW
60° (8'6" × 16' STALLS)

With diagonal parking, a grassed light rail median could be provided by narrowing lanes and reducing the angle of the diagonal parking spaces. Loading islands in the median between the tracks or left-turn lanes could be accommodated by employing parallel parking on one side of the street with total parking spaces remaining about the same. Light rail could also be operated in the existing traffic lanes adjacent to the median using the median for loading islands or for left-turn pockets, but with reduced speed and service reliability.

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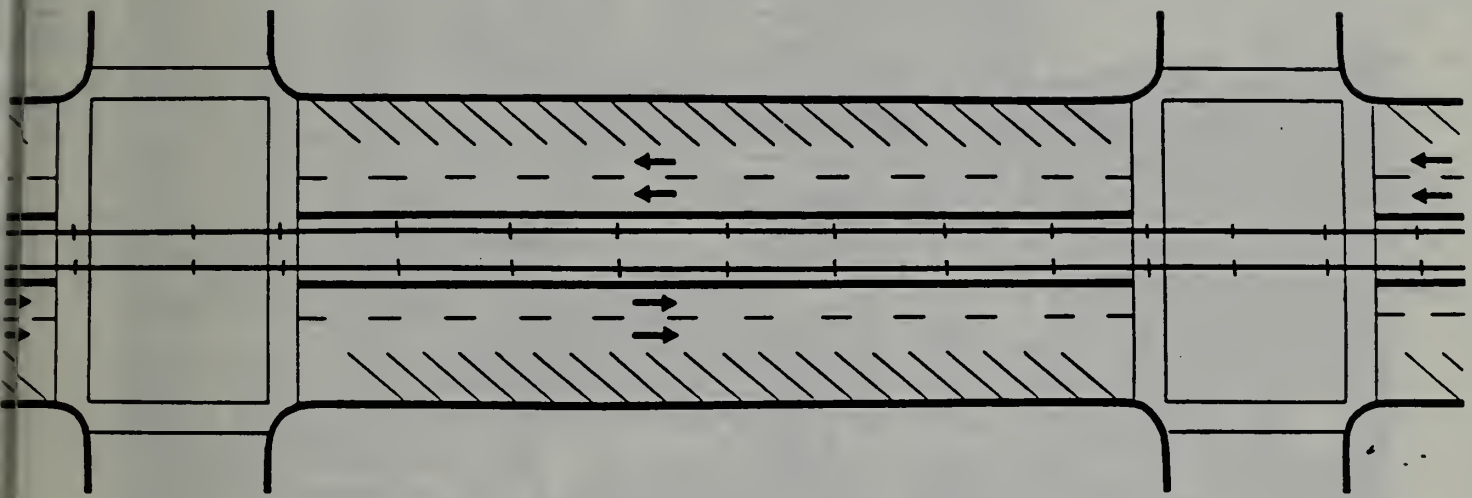
FIGURE 11

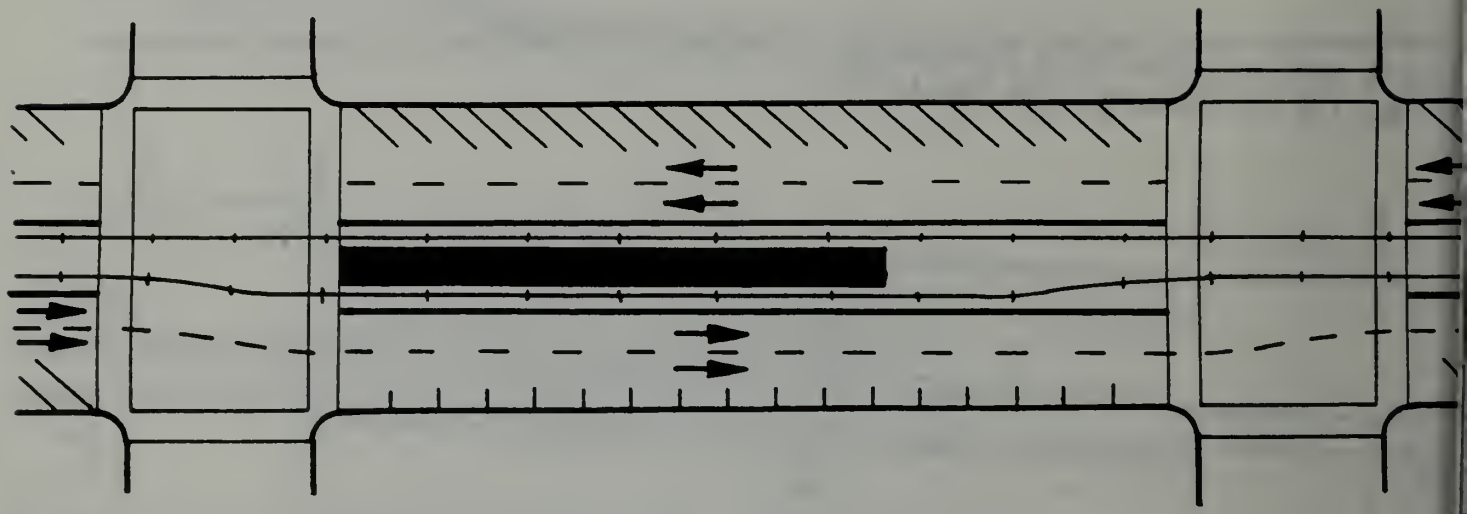
ENTER OPERATION WITH PARKING (99' CURB TO CURB)
AT 40° (8'-16' STALLS) OR PARALLEL



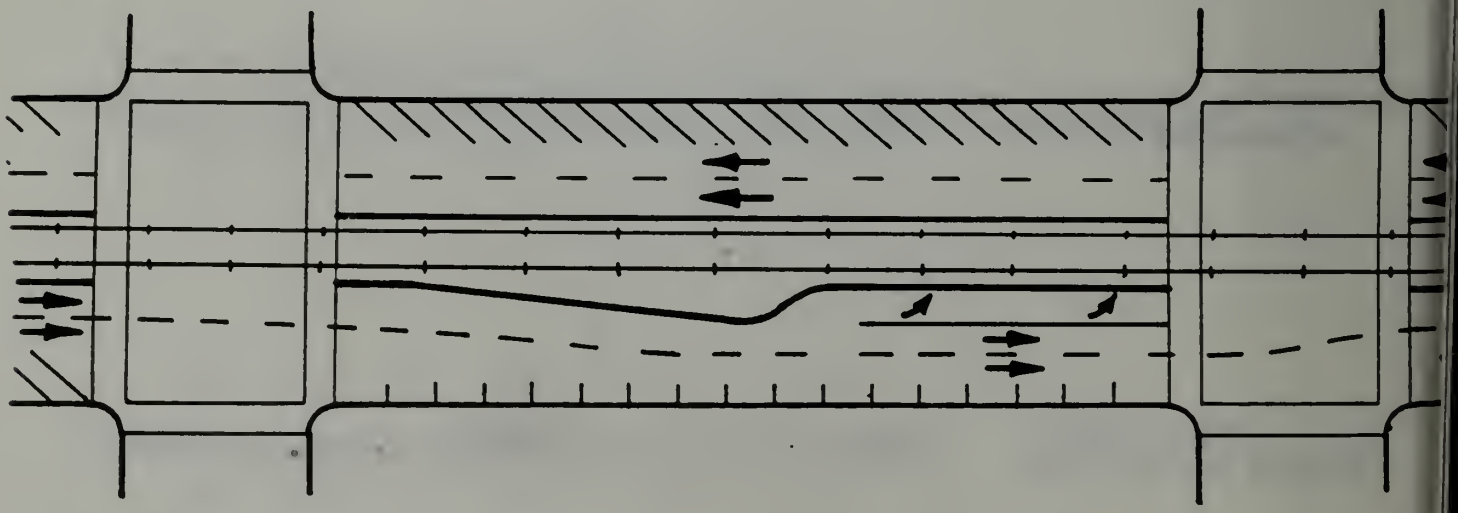
As shown above, where there is diagonal parking, a grassed light rail median can be provided by narrowing lanes and reducing the angle of the diagonal parking.

FIGURE 12

CENTER OPERATION WITH CENTER BOARDING PLATFORM



CENTER OPERATION WITH LEFT-TURN LANE



Where a loading island or left-turn lane is needed, parallel parking could be substituted for diagonal parking on one side of the street. Since existing bus zones would also be replaced by either parallel or diagonal parking, the total number of parking spaces would remain about the same.

FIGURE 13

On outer Geary, west of Park Presidio Boulevard, where left-turns are now allowed, there is room for the four existing traffic lanes, if narrowed, a grassed median for light rail, the existing number of parking spaces, and left-turn lanes. Adjacent to left-turn lanes or median loading islands, parallel parking would be substituted for diagonal parking. Since there would be no curb bus zones, the number of parking spaces would stay the same.

Between Masonic and Park Presidio, where there is now parallel parking and six traffic lanes, either parking could be removed or one lane of traffic in one direction could be removed to provide room for a grassed median with loading islands and left-turn lanes. Removing a lane would increase parking; otherwise, parking would be slightly reduced.

The photo above is of the new light rail line in Santa Clara County. Modern and quiet cars like these would be used on Geary instead of the cars currently used on the Muni Metro system.

FIGURE 14

If the loading islands are placed between the tracks in the median, it would also be possible to provide shelters. This is a photo of a stop on the new light rail line in Santa Clara County.

9. LIGHT RAIL ON DOWNTOWN GEARY STREET

The relative narrowness and congestion of downtown streets east of Gough led the Task Force to be divided between those favoring a subway and those favoring a surface treatment. Those favoring the subway were particularly concerned with frequent incidents of intersection traffic blockages and the fact that a separate right-of-way for light rail could not be provided downtown without eliminating parking on one side of the street. It was also believed by subway supporters that a subway would be substantially faster than surface operation. Those favoring a surface alternative were most concerned about the several times greater cost of a subway and the problem of raising the necessary funds for construction. Also, surface supporters believed that adequate transit priority treatments could be implemented to provide good service and that it was more convenient and pleasant to access and ride a surface line.

- Downtown Subway Alternative -

Routes

Two basic routes were found to be optimal: under Geary or under Post Street connecting to the Geary Expressway via Peter Yorke Way.

Downtown Subway Terminals

Since both Geary and Post end at Market Street short of the existing Transbay Terminal destination of the Geary bus, a number of downtown routings were investigated. A considerable obstacle to south of Market subway extensions is the two-level Market Street subway. It is difficult to tunnel over the double-deck subway or under it. It would also be impractical to join a Geary subway to the Market Street Muni Metro subway due to engineering problems and the fact that the Muni Metro subway is operating at capacity already. The intersection of Third and Market Streets appears to be the only point near Post or Geary where a shallow crossing of the BART and Muni Metro subways may be feasible, if at all. Station mezzanines block the intersections of Fourth, Montgomery, or Second Streets. The remaining intersections at First or Fremont Streets might be used to cross the subways between stations; however, the subway would have to zig-zag north of Market Street possibly on Kearny and Bush Streets to reach First Street or on Pine to reach Fremont.

In summary, routes south of Market would most likely have to use a Kearny and Third crossing of the Market Street subway or a very deep tunnel at other locations.

Geary-Third & Mission or Howard If a subway crossing of Market were technically feasible, a south of Market extension could be routed under Third and then either under Mission or Howard to the vicinity of the Embarcadero. Though, numerous routes south of Market could be used. The feasibility of a route south of Market depends on the engineering feasibility of building a tunnel either over or under the Market Street BART and Muni Metro subways. Since there is no station under the intersection of Third and Market Streets, it may be possible to install a subway in the space between the street surface and the top of the Muni Metro subway.

Geary-Kearny-Columbus-North Point This routing would provide rapid transit service

FIGURE 15

A subway for light rail could supply fast, reliable service through the downtown with no disruption to existing traffic patterns on the surface. On the other hand, the cost is steep, and the travel time reduction for a downtown subway is only a few minutes compared to a surface light rail line with transit priority treatments. A subway with stations would cost about $185 million per mile for two miles in the downtown versus about $8 million per mile for surface rail. Above is a photo of the Muni Metro subway on Market Street.

to one of the most densely populated corridors of the City along Columbus Avenue and would avoid the problem of the Market Street subway barrier. However, this route tends to by-pass much of the financial district to the east of Kearny or south of Market Street, as well as direct connections to BART or Muni Metro.

Geary-Peter Yorke-Post-Montgomery-Columbus-North Point This route would reach further into the financial district than a Geary subway and would connect directly with the Muni Metro/BART station and possibly with a future downtown extension to Second and Market of the Peninsula commute train service. A study of such an extension along with other terminal routings is now under way.

Geary-Union Square-Post-Montgomery-Columbus-North Point This subway route would pass from Geary to Post Street diagonally under Union Square using one of the garage levels as an underground station. This route would have the advantage of the Post-Montgomery route of reaching further into the financial district and connecting directly with Muni Metro and BART. In addition, it would have the advantage of staying on Geary nearly all the way to Market Street providing a more identifiable route for patrons. The additional cost or engineering difficulty of using a level of the Union Square garage, if any, has not been determined.

Subway Stations

Stations at Market Street, preferably connecting at a BART-Muni station, Union Square, and Van Ness Avenue are obvious necessities. A station midway between Union Square and Van Ness Avenue probably in the vicinity of Jones and Leavenworth would also appear to be required to fill this long gap between major activity areas.

Subway Advantages

The principal advantages of a downtown subway are: 1) freedom from conflict with surface traffic, 2) faster operation, and 3) avoidance of disruptions of vehicle access to hotels and businesses along narrow downtown streets.

Subway Disadvantages

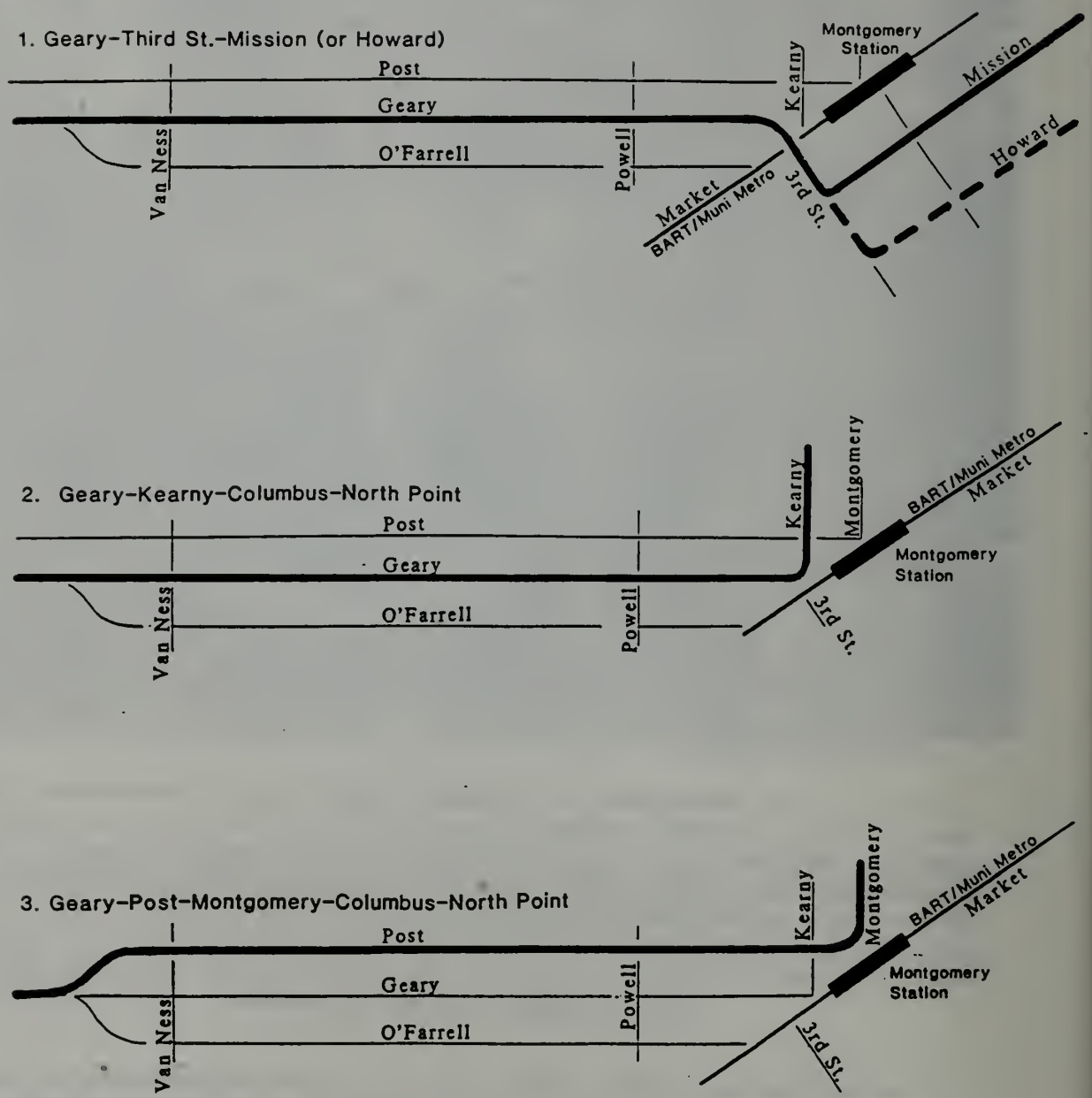
The principal disadvantages of a downtown subway are: 1) substantially higher capital costs on the order of $300 million additional cost, 2) little or no savings in operating costs due to the need to staff stations and maintain the subway, 3) longer implementation time to obtain financing due to higher cost, and 4) minimal time savings of only 3 to 6 minutes excluding added access time to walk to stations.

- Downtown Surface Light Rail Alternatives -

The Geary Expressway changes from a broad 127-foot wide expressway west of Gough to narrow one-way streets east of Gough. Eastbound traffic to the downtown is diverted to O'Farrell Street at Gough via Starr King Way. Westbound traffic from downtown uses Geary Street to access the Geary Expressway at Gough. The main transit streets downtown are O'Farrell, Geary, Post, and Sutter Streets, each of which has a right-hand transit lane 18 feet wide which also serves as a parking lane in non-peak hours. Each of these streets has room for three narrow lanes at Franklin narrowing to a width which can only accommodate two wide lanes further east towards Market Street. Parking is provided on each side of these streets. The street widths are shown in Table VIII.

FIGURE 16

DOWNTOWN SUBWAY ALTERNATIVES



The Market Street subway blocks the crossing of Market by another subway except between stations. Engineering studies are needed to determine the cost and feasibility of crossing Market at Third and Kearny Streets. From Third, the subway could proceed further downtown via Mission or Howard Streets. If Market cannot be crossed by a subway, a subway routing via Post would allow the subway to reach further into the financial district with possibly an extension north along Montgomery and Columbus.

TABLE VIII

DOWNTOWN STREET WIDTHS

O'Farrell (eastbound)		
Franklin to Hyde	44.9 feet wide	3 lanes
Hyde to Market	38.75 feet wide	2 lanes
Geary (westbound)		
Gough to Mason	44.9 feet wide	3 lanes
Mason to Market	38.75 feet wide	2 lanes
Post (eastbound)		
Gough to Taylor	48.9 feet wide	3 lanes
Taylor to Market	38.75 feet wide	2 lanes
Sutter (westbound)		
Gough to Grant	44.9 feet wide	3 lanes
Grant to Market	38.75 feet wide	2 lanes

- Alternative Downtown Surface One-Way Street Treatments -

Wide-Street--One-Way Center-Median--Mason to Gough

The opportunity for a center median is limited in the downtown. On the wider portions of these streets, there would be room for center lane medians for a single track on each street. Since Post is wider than the other streets west of Taylor, use of this street instead of O'Farrell would be preferable for the inbound direction. O'Farrell narrows at Hyde, a considerable distance from Market. The inbound track would then access a center median track on Post from Geary via Peter Yorke Way. (A signal pre-empt would be needed at Gough to allow inbound LRV's to crossover westbound Geary to Peter Yorke Way.)

Features:

1. Post--12' center separate trackway median on Post from Peter Yorke to Taylor.

2. Geary--10' center separate trackway median on Geary from Gough to Mason.

3. Traffic prohibited from crossing median (with the exception of cross traffic at intersections).

One-Way Narrow-Street Treatments--Market to Mason

On the narrow portions of Geary and Post Streets, one of the following treatments could be used with the existing one-way street pattern:

Alternatives:

1. Side-of-the-Road Rail-only lanes adjacent to the curb.

2. Transit Priority Lanes Painted transit lanes adjacent to parking. The lanes would be the same in appearance and width as the existing bus lanes and could be used by autos to access parking spaces or make right-turns.

3. Two-Way Transit-Commercial Street (On Geary or Post) Convert the narrow downtown portion of either Post or Geary to a transit-commercial street which would be restricted to transit and commercial vehicles only.

   --With a transit-commercial street treatment on inner Post, eastbound auto traffic on Post would be required to either turn left at Taylor or right at Mason. The outbound light rail track would turn left off Post onto Mason and then use a center lane median on Geary west of Mason. Between Taylor and Mason on Post, the inbound track would be on the left half of the street allowing auto traffic to use the right hand lane as far as Mason where all auto traffic would turn right onto Mason. If the transit-commercial street were on inner Geary Street east of Mason street, the tracks would be in the center medians of Post and Geary west of Mason; however, the inbound tracks on Post would use the right hand lane between Taylor and Mason and turn right onto Mason to reach Geary and proceed downtown.

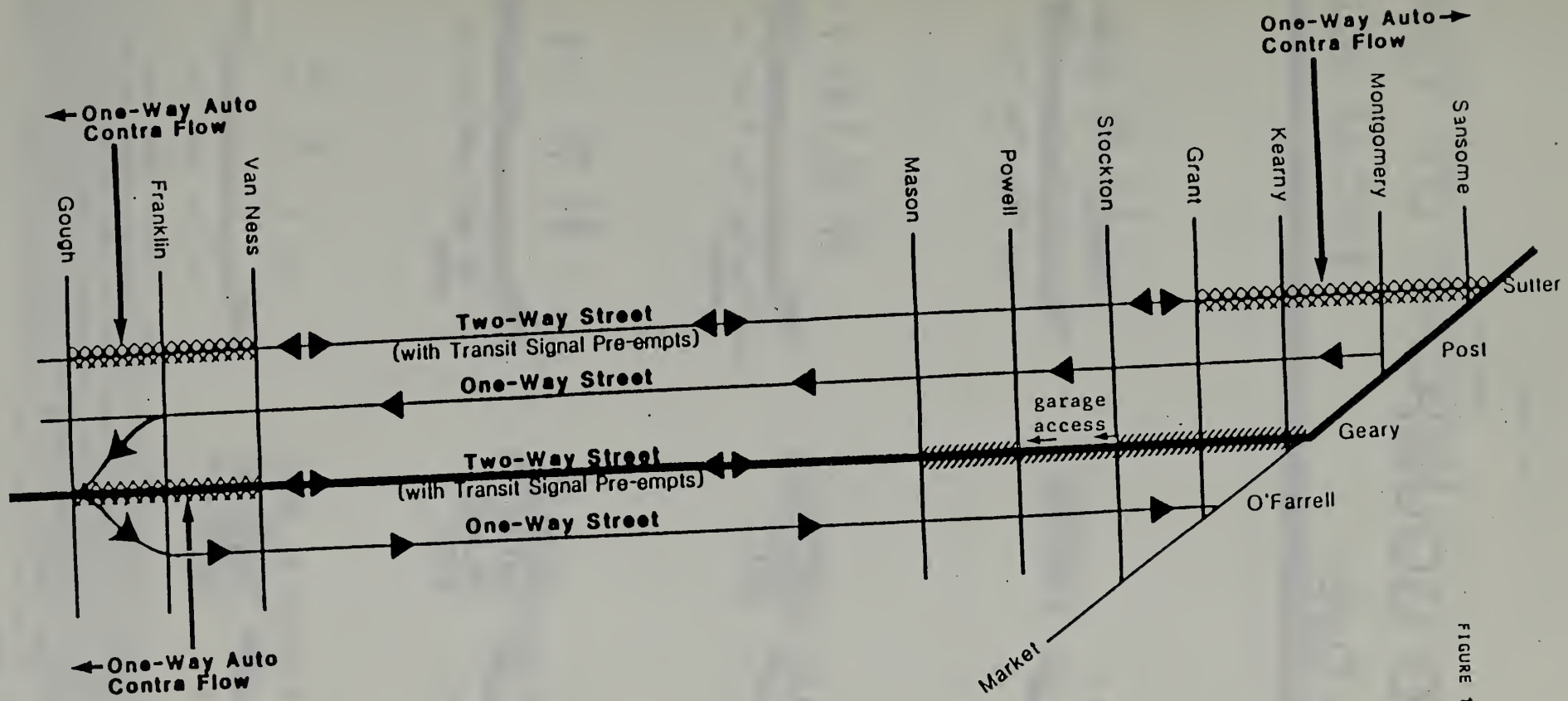


FIGURE 17

Geary Two-Way Street

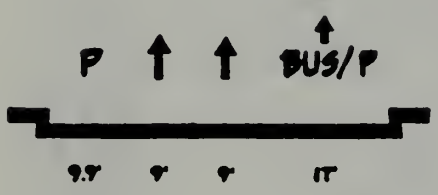
With this alternative, Geary and Sutter would return to be being two-way streets for transit, and Post would be reversed to one-way westbound for autos. This is the pre-1970 traffic pattern for these streets with the exception that autos would not be allowed onto Geary in the eastbound direction at Gough. A number of treatments could be employed to encourage autos to use O'Farrell and Post Streets. Signals can be timed to favor transit on Geary and Sutter and autos on Post and O'Farrell. Signals can be partially pre-empted to provide more green time for transit and less for autos on Geary or Sutter. Special transit lanes could also be provided on one side of Geary for light rail.

DKS

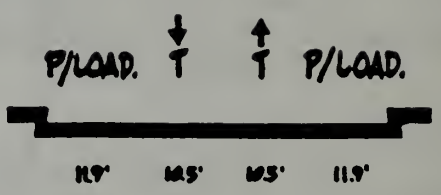
FIGURE 18

MASON TO GOUGH

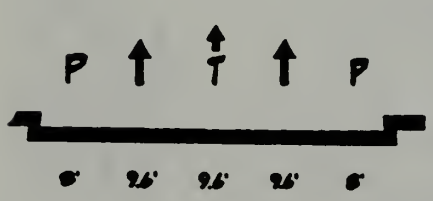
44.9' Curb to Curb



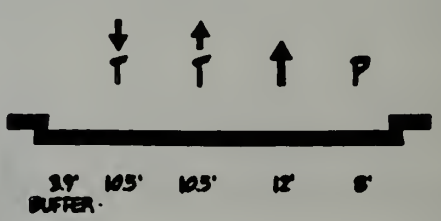
EXISTING



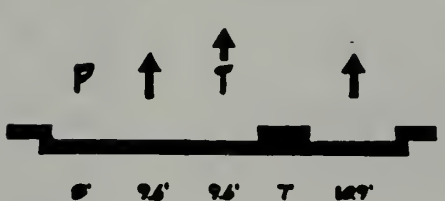
CENTERED TWO-WAY



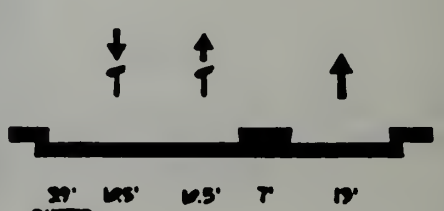
CENTER LANE RAIL



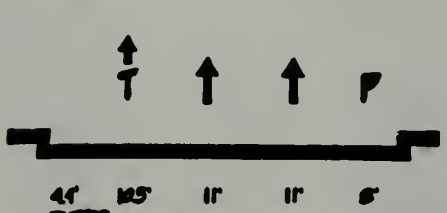
SIDE OF ROAD TWO-WAY RAIL



CENTER LANE ISLAND STOP



SIDE OF ROAD TWO-WAY RAIL WITH STOPS



CURB LANE RAIL

If the one-way street pattern were retained, light rail could operate in the center lane or in a lane adjacent to the curb. The existing bus lane is too narrow and too close to parked cars for rapid, safe operation. If light rail were operated on Geary in both directions, the tracks could either be located in mixed traffic or in transit only lanes on one side of the street. The track lanes could be weaved from one side of the street to the other, block by block, if direct access to particular buildings were a necessity. Through traffic would be diverted to Post and O'Farrell to obviate congestion on Geary.

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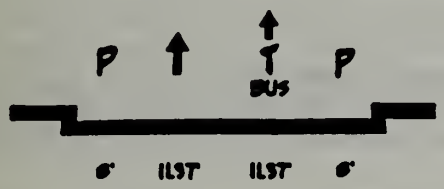
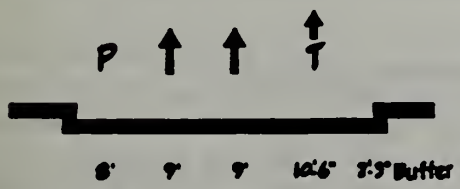
FIGURE 19

MARKET TO MASON

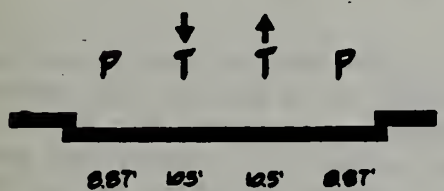
38.75' Curb to Curb



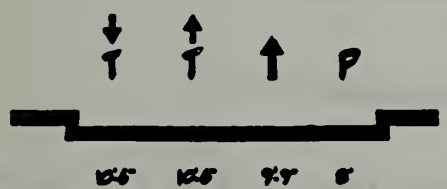
EXISTING



CURB LANE RAIL



GEARY TRANSIT MALL



SIDE OF ROAD
TWO-WAY RAIL
MID-BLOCK

Where the streets narrow further to the east, downtown, the light rail tracks can be placed in the existing bus lane or in a lane adjacent to the curb for one-way operation. For two-way operation on Geary, the tracks can be centered with parking on either side, preferably with traffic restricted to transit and commercial vehicles only; or, the tracks can be placed on one side in transit-only lanes leaving room for one traffic lane and one parking lane on the other side.

4. Traffic Signals Transit signal timings with partial pre-empts would be provided to minimize delay.

Without a downtown transit-commercial street treatment or a side-of-the-road trackway, the one-way street, center-lane, median treatment west of Mason would tend to be impractical. Without one of these treatments, it would be too difficult to operate east of Mason or Taylor where traffic congestion is most severe. With either the mixed traffic or the right hand transit priority lane treatments, the problem of autos or trucks accessing the parking lane, which would then be adjacent to the track lane, would most likely prove to be intolerable.

One-Way Center-Median Advantages

The center lane median combined with a transit-commercial street or side-of-the-road treatment downtown has the advantages of 1) separating transit from traffic along the full route and 2) retaining most or all of the existing downtown one-way street traffic patterns.

One-Way Center-Median Disadvantages

Both the transit-commercial street and the side-of-the-road trackway would eliminate parking and direct taxi access downtown.

The center lane medians (west of Mason) would require auto traffic to be restricted to one side of the center lane or the other once vehicles have entered the street. This treatment would be needed in order to prevent autos from transitioning from one traffic lane to the other across the median and disrupting light rail movement. Double-parked vehicles could pose problems by forcing other traffic onto the median in order to pass around. This would probably be a minor problem, however. Signals would have to be retimed for transit, possibly with partial pre-empts. These treatments would slow auto traffic but minimize delay to transit vehicles which would be the major carrier on the two streets.

A downtown transit-commercial street on either Post or Geary connecting with the center-lane medians would make automobile travel in the downtown more complicated. If the transit-commercial treatment were installed on downtown Post Street, eastbound traffic on Post would be detoured down Mason to O'Farrell. However, this problem would have a minimal impact since there is little through traffic on Post while O'Farrell would have an extra lane in the downtown direction since the existing transit lane would be eliminated. Similarly, if Geary were the downtown transit-commercial street, westbound traffic would not be able to use Geary between Market and Mason and would have to detour via a parallel street such as Sutter or Ellis.

- Contra-Flow Lanes on One-Way Streets -

A contra-flow lane is a side-of-the road transit lane on a one-way street that operates in the opposite direction of general traffic. The street is then essentially a two-way street with transit operating in one direction and autos in the other. The principal advantage of the contra-flow system is that it is self enforcing; in order to violate a contra-flow lane, autos would either have to operate in the lane against the flow of transit traffic or enter a one-way street in the wrong direction. The principle disadvantage of this system in this application would be the need to remove one parking lane on each of two of the one-way streets. Where the streets narrow, an additional

traffic lane would be provided. However, on the wider portions where there are now two traffic lanes and a with-flow transit lane, the number of traffic lanes would remain the same; the traffic lanes are too narrow to allow simple removal and widening of a parking lane to provide a contra-flow lane.

- With-Flow Trackway in Transit Lanes on One-Way Streets -

A with-flow trackway using a transit-lane treatment would be essentially the same as the existing transit priority treatments on O'Farrell, Geary, Post, and Sutter Streets where transit vehicles operate in a painted transit lane adjacent to the parking lane on the right-hand side of the street. This treatment would require the reduction of one traffic lane on the wider, westerly portions of these streets due to the fact that the existing transit lanes are too narrow to allow safe operation of light rail vehicles adjacent to parked autos.

This alternative has the advantage of requiring the minimum change in traffic patterns. It has the disadvantage that autos would be allowed on the trackway to make right-turns or to park, creating conflict with light rail vehicles and consequent delays. Also, timing of traffic signals for transit would cause delays to auto traffic.

* * Task Force View on One-Way Street Treatments * *

There was little support on the Task Force for any of the one-way street treatments; though, there was enthusiastic support from one member for maintaining the existing one-way street pattern by placing the light rail tracks in the existing right-hand, curb lane, transit lanes on Geary and O'Farrell Streets.

- Two-Way Geary Transit Priority Street -

The other general approach to providing surface access to the downtown for light rail investigated by the Task Force involves converting Geary to a two-way street from Gough to Market. Post Street would be reversed to provide a westbound general traffic feeder to the Geary Expressway via Peter Yorke Way. Sutter would also become a two-way transit priority street. This is the same traffic pattern that existed before 1970 but with special transit priority treatments to speed service on Geary and divert autos to Post and to O'Farrell. Auto service on Post and O'Farrell would be improved with better signal timing and more lanes for autos from the removal of the existing transit lanes which would become redundant. Overall auto capacity would remain about the same as today since the transit lanes on Post and O'Farrell Streets would be eliminated and some traffic could still be permitted on Sutter and Geary.

As a general rule, time and motion analyses of transit vehicle movement on San Francisco streets have shown that at most locations the principal cause of delay to transit movement outside of loading time is traffic signal timing rather than too many autos. Heavy traffic, in fact, frequently causes delays by preventing buses from getting to loading zones during red lights.

The Market Street transit-priority stop reorganization and signal timing system implemented in 1985 is an excellent example of how changing traffic signal timings to match the movement of transit vehicles can speed up transit service even in heavy transit and auto traffic conditions. Essentially, the lights are timed so that buses arrive at stops on Market at the end of the green phase when there is no queue of autos and thus no delay in reaching the stop. Blockage of intersections, grid-lock, and back-ups at bus stops or loading islands now occur much less often on Market. Transit-optimized traffic signal timing has smoothed and regulated both transit and auto flows. The same principles can be applied to Geary.

A combination of the following transit priority treatments could be used to speed transit and encourage auto drivers to use Post and O'Farrell to travel between the downtown and the Geary Expressway:

Summary of Two-Way Geary Transit Priority Street Treatment

1. Sutter:

   a. Gough to Van Ness

      --Eastbound: contra-flow, side-of-the-road lane for transit-only.
      --Westbound: mixed transit and auto lanes.

   b. Van Ness to Kearny.

      --Two-way: one wide mixed traffic lane in each direction.

   c. Kearny to Market.

      --Eastbound: mixed transit and auto lanes.
      --Westbound: contra-flow, side-of-the-road lane for transit-only.

   d. Traffic signals timed for transit.

2. Post:

   a. One-way, westbound (i.e. reversed), general traffic, no transit.

   b. Access to Geary Expressway via Peter Yorke Way.

   c. Traffic signals timed for autos.

   d. Existing transit lane becomes an additional traffic lane.

3. Geary:

   a. Gough to Van Ness.

      --Westbound: one-way auto lanes.
      --Eastbound: double-track, side-of-the-road lanes for light rail.

   b. Van Ness to Powell.

      Either:

      (I) Two-way: one mixed traffic lane in each direction.

      (II) Side-of-the-road: two-way trackway plus one auto lane and one parking lane.

      (III) Transit-commercial street.

   c. Powell to Market.

      Either:

      (I) Eastbound-only auto lane with side-of-the-road double-track lanes for light rail.

      (II) Transit-Commercial Street from Powell to Market.

   d. Traffic signals timed for transit.

4. O'Farrell:

   a. One-way, eastbound, general traffic, no transit.

   b. Traffic signals timed for autos.

   c. Existing transit lane becomes an additional traffic lane.

Detailed Description of Two-Way Transit Priority Street Treatments

Traffic Diversion at Gough and at Market

The purpose of the traffic diversions at Gough and at Market on Sutter and on Geary

would be to reduce the volume of traffic on Geary and Sutter to a level that would not interfere with transit vehicle operation. Diversions at these locations would be primarily aimed at through-traffic traveling between the neighborhoods west of Gough and the financial district. Hence, autos would be allowed to flow westbound-only at the west end of the transit priority segments and eastbound-only at the east end of the segments, effectively diverting through traffic off the downtown portions of Geary and Sutter. This traffic would be diverted to Post and O'Farrell which would become in effect a one-way couplet, free of transit lanes and frequently stopping transit vehicles.

These one-way street diversions need only be one-block long to divert through traffic; however, since Gough, Franklin, and Van Ness are major feeders, as are Kearny, Stockton, or Montgomery streets in the downtown, longer one-way segments would be needed to divert most through-traffic from Geary and Sutter onto Post and O'Farrell. The recommended one-way westbound segments would then be Gough to Van Ness on the west end of the transit priority areas of Sutter and Geary. Auto traffic would be eastbound-only from Powell to Market on Geary, and from Kearny to Market on Sutter.

On Geary, between Gough and Van Ness, both tracks would be on the south side of the street adjacent to the curb. From Powell to Market (unless a transit-commercial street were used) on Geary, a double-track, side-of-the-road, trackway would be located on the south-side of the street leaving room for one parking lane and one eastbound traffic lane on the north half of the street. This arrangement would result in the curb lanes flowing east with the center track lane flowing west which could prove confusing to pedestrians. However, this arrangement would be necessary to allow eastbound autos to turn left onto either Grant or Kearny, northbound one-way streets. The low volume of transit vehicles and the fact that they would not be making turning movements should tend to reduce confusion to pedestrians. Passenger loading would be from the curb for eastbound LRVs and from islands for the other direction on Geary Street with the curb-side trackway.

On Sutter, between Gough and Van Ness, westbound buses would operate in the right-hand traffic lane as usual, and eastbound buses would operate in a curb-side, contra-flow, transit lane. Downtown, between Market and Kearny, the arrangements would be reversed. Eastbound buses would operate in mixed traffic, and westbound buses would operate in a curb-side, contra-flow, transit lane. Buses would load from the curb in both directions as usual.

Transit-Commercial Street

A transit-commercial street on the last few blocks near Market Street could be provided instead of a side-of-the-road treatment to eliminate conflict with autos on the most congested portion of the street and to divert westbound autos onto Post Street. A transit-commercial street would allow trucks and taxis to access the transit-commercial segment to load goods or passengers. The minimum transit-commercial street segment that would be effective would include the two blocks from Kearny to Stockton on Geary. A transit-commercial street extending as far west as Powell or Mason would be most desirable for minimizing auto flows on the mixed traffic portions of Geary. Though the principal application suggested for this treatment has been the downtown portion of Geary, this treatment could be used on any segment of Geary or Sutter depending on localized needs for auto access or environmental improvement.

Passenger loading on a transit-commercial street would be from curb bulbs, that is, extensions of the sidewalk on either side of the street, about 9 feet on the narrower portions and about 11 feet on the wider portions. (A sign would be placed on the end of

FIGURE 20

An alternate method of providing faster, more reliable service approaching that of a subway is to ban autos except for commercial vehicles and taxis. This has been done on a number of key downtown streets in numerous cities in the United States, Canada, and Europe. The photo above is of the Bahnhofstrasse in Zurich, Switzerland, a very successful retail street where retail rents are the highest in the world.

FIGURE 21

Another photograph of the Bahnhofstrasse in Zurich. Such transit commercial treatments have been employed with great success in many major cities including Portland, Oregon; Vancouver, Canada; Minneapolis, Minnesota; Philadelphia; Munich, Germany, and London, England.

the 11 foot extensions to warn off motorists as with loading islands.)

Double-Track Side-of-the-Road Right-of-Way

A side-of-the-road, double-track treatment can be used on any congested portion of Geary Street between Gough and Market Street. This treatment has the significant advantage of separating light rail transit from auto traffic. One lane of parking on one side of the street would be removed. There would be room for a single lane of auto traffic. This treatment could be weaved from one side of the street to the other at intersections, on a block by block basis, to accommodate local conditions.

Cobble-Stone Pavement Cobble stones could be used for paving a side-of-the-road trackway to discourage encroachment by autos and to provide a decorative appearance. An attractive, cobble-stone, side-of-the-road trackway is now in use for the new light rail line in downtown Portland, Oregon.

Side-of-the-road passenger loading would be from the curb in one direction and from islands in the other. Parking would be removed opposite the islands (in both directions) to provide adequate room for the island, track lanes, and auto lane.

Mixed Traffic Transit Priority Treatments

Where parking on both sides of the street is considered a pre-eminent priority, mixed traffic operation could be a workable option in combination with traffic diversion at Gough and Market and with other transit priority treatments described below. Since the street is too narrow for more than two traffic lanes wide enough to include light rail tracks plus parking lanes, the tracks would have to be located in mixed traffic adjacent to the center dividing line. On the wider portion of Geary, west of Mason, this arrangement would provide about 4 feet of space between light rail vehicles and parked cars allowing speedy, safe operation. Since the two principal causes of delay to transit - too many autos and unfavorable traffic signal timings - could be eliminated, light rail operation could then be nearly as fast as if there were no autos or traffic signals at all.

Loading with mixed traffic operation would be from curb bulbs extending 8 feet from the curb in the narrow portions and about 11 feet on the wider portions of the street as described above for a transit commercial street. The bulbs would be located mid-block to avoid delays from autos queued at stop lights and to provide room for right-turn lanes at intersections.

Mixed Traffic Parking Enforcement If parking is retained on both sides of the street, requiring light rail operation in mixed traffic adjacent to parking lanes, enforcement would be necessary to prevent double-parked vehicles from blocking the track lanes. This enforcement would probably require one parking controller on duty at all times of operation. Increased use of white zones and yellow zones to facilitate loading could also be used to reduce double-parking.

Mixed Traffic Turn Pockets Turning lanes can be provided to prevent vehicles waiting to make turns at intersections from blocking approaching light rail vehicles.

Traffic Signal Timings Timings can be set to favor transit on Geary and Sutter and to favor autos on Post and O'Farrell. Timings for transit would allow time for transit vehicles to stop and load during red lights and proceed without delay to the next stop after loading. Such timings would be slow for other traffic causing auto drivers to

FIGURE 22

Another option, on narrow downtown streets, is to place the track on one side of the street with passenger loading from the sidewalk as in Portland, Oregon, above. A variation of this treatment, favored by the Task Force, included placing both tracks on one side of Geary with loading from the sidewalk for one direction and loading from islands for the other direction. These treatments have the advantage of leaving a lane available for mixed traffic and parking.

select Post or O'Farrell.

Traffic Signal Pre-Empts Traffic signals on Geary and Sutter can be set to give short green times for Sutter and Geary except when a transit vehicle is approaching and pre-empts the signal increasing the length of the green phase. This type of pre-empt would both discourage through auto travel on Geary or Sutter and speed transit. This arrangement would also have the benefit of giving longer average green times for north-south auto traffic crossing Geary and Sutter.

Network Traffic Signal Control Downtown computerized traffic signal network control could be used to clear traffic on cross streets when there are back-ups into Geary intersections. Generally, this would be accomplished by increasing the green time at nearby intersections to allow autos to travel away from the area of congestion and restrict the flow of autos entering the area.

Traffic Lane Capacity Maintained

On the wider portions of the downtown streets - O'Farrell, Geary, Post, and Sutter - there are a total of four traffic lanes inbound and four westbound, that is, two lanes on each street. In addition, each of these four streets has a transit-only lane. With the two-way Geary and two-way Sutter proposal, there would still be four mixed traffic lanes in each direction: one each direction on Sutter and Geary and three westbound on Post and three eastbound on O'Farrell. If the double-track, side-of-the-road treatment were used on Geary, one mixed traffic lane would be deleted.

On the narrow portions of the downtown streets closer to Market, there are two mixed-traffic lanes and two transit lanes in each direction, one of each on each street. With the two-way street treatments, Post and O'Farrell would have two traffic lanes each. Thus, even if the transit-commercial street treatment were implemented on Geary and Sutter, the number of auto lanes would be unchanged from present. If the side-of-the-road treatment were used on Geary or the contra-flow bus lane on Sutter, eastbound auto capacity would be increased by one lane on Geary and two lanes on Sutter.

Essentially, the overall auto capacity of the downtown streets would remain unchanged, especially in the crucial few blocks closest to Market Street.

Two-Way Transit Priority Street Trade-offs

Timing signals on Geary and Sutter to favor transit and on Post and O'Farrell to favor the auto and diversion of through auto traffic off Geary and Sutter at Gough and at Market are the minimum treatments needed to reduce traffic levels to a manageable level on downtown Geary or Sutter Street for free-flowing transit operation.

The two-way street approach results in a dramatic change in traffic flow patterns as compared to the existing one-way street system or to a subway. However, the resulting traffic pattern would still be quite straight forward. Eastbound auto travel from the Geary Expressway onto O'Farrell would not change at all. In addition, there would be no competition with buses or bus lanes on either O'Farrell or Post improving traffic flow. In the westbound direction, Post Street would provide excellent through access to the Geary Expressway via Peter Yorke Way from the downtown. The major arteries of Stockton, Kearny, and Montgomery could still feed into Post as conveniently as into Sutter or Geary which now provide for westbound traffic. Access to the Union Square garage to and from Post would be via the existing peripheral lane around Union Square which would remain unchanged.

It is reasonable to conclude then that the trade-offs involved with implementing a two-way street transit priority system for light rail would be minimal in magnitude and would consist primarily of changing existing traffic patterns rather than reducing auto capacity or vehicle access to the downtown.

Two-Way Transit Priority Street Route Variations

The most straight forward arrangement of transit and auto streets is to designate Geary and Sutter as two-way transit priority streets and O'Farrell and Post as one-way auto oriented streets. However, either O'Farrell or Post could be designated as a two-way rail transit street. For example, if Post were the two-way transit priority street, Geary and O'Farrell would remain unchanged as one-way auto streets. If O'Farrell were designated the two-way rail transit street, then Post and Geary could become one-way auto oriented streets but with reversed flow to make use of Peter Yorke Way to connect an outbound Post Street to the Geary Expressway.

One of these other routes could be used if there were more public support for light rail on one of the streets other than Geary.

Two-Way Transit Priority Street Advantages

The principal advantages of the two-way street treatment are 1) greater segregation of auto traffic and light rail, 2) minimum travel times for both through auto traffic and light rail, 3) little change in the total number of through lanes available to the auto, 4) simplified, direct routings for both auto traffic and light rail, and 5) the potential for a separate right-of-way for light rail by using either a double-track side-of-the-road treatment or a transit-commercial street treatment.

Two-Way Transit Priority Street Disadvantages

The principal disadvantage of the two-way street treatment are 1) the need to restructure traffic patterns, 2) the need to operate on the surface in the congested downtown, 3) possible disruption to business access along the street due to traffic reroutes or removal of parking, and 4) the need to remove either parking or traffic lanes in order to provide transit-only lanes for delay free operation of light rail.

- Light Rail Operation on Market Street -

The financial district could be accessed from Geary Street by the existing streetcar tracks on Market Street with any of the one-way street or two-way street alternatives discussed above. Alternatively, tracks could be installed in the curb lanes of Market Street between Geary and First/Fremont to facilitate turning movements from Market Street onto First Street in the inbound direction and onto Geary Street in the outbound direction. Placing the Geary line light rail tracks in the curb lanes would also improve the distribution of transit vehicles between the curb and center lanes. The 38-Geary motor coach currently uses the curb lanes for these reasons. The east side of Grant Avenue could be used for inbound light rail vehicles between Geary and Market to avoid the complexities of feeding eastbound light rail vehicles onto Market at Kearny and Geary.

The downtown terminal for a Geary light rail line could be located at the Transbay Terminal which is the current 38-Geary terminal, the Ferry Terminal, or any other suitable financial district location. Market Street already has transit priority treatment with four-lanes of transit operation and signals timed for transit.

* * Task Force Preferred Treatment for Surface Light Rail * *

The two-way street set of transit priority treatments for light rail was preferred by the Task Force with the exception of those members who would only support a subway alignment. Those who most avidly supported a surface treatment preferred a double-track side-of-the-road treatment on a two-way Geary Street downtown because of the potential for low cost, fast operation, and convenient access to stops that is not possible with a subway.

APPENDIX A

Geary Rail - Order of Magnitude Capital Costs

MUNI

MEMORANDUM

TO: William G. Stead

FROM: Peter Straus

DATE: 18 Aug 86

SUBJECT: Geary Rail - Order of Magnitude Capital Costs

With a hearing on creation of a Task Force scheduled for Thursday and an as-yet-unanswered request for cost data from Sup. Maher before me, I have over the past weeks collected some data from recent work on the J-connection and Metro turnaround projects which can generate some order-of-magnitude estimates for a Geary rail project.

Assumptions and sources:

1. Surface rail construction: $8.125 M/double track mile. This is based on the $6.5 million/mile estimated cost for the J-line project, with 25% contingency added.

2. Subway construction: $185 M/double track mile. This may be conservative (i.e., high), but is based on the estimated costs for the more expensive portions of the Metro turnaround project.

3. Subway station finishing: $20 M/station. A ballpark estimate.

4. Mall finishing: $40 Million. Another ballpark figure, but based in part on 1983 costs for Portland's transit mall.

Geary estimates:

Application of these figures yields the following estimates for four concepts of a Geary rail project: (It should be reiterated these are at best ONLY order of magnitude estimates.)

1. All surface, nothing fancy, 7-miles. $60 million

2. All surface, Union Square to Market Street mall treatment. $100 million

3. Subway to Laguna (2 miles, 4 stations), surface, Laguna to Ocean Beach (5 miles) $500 million

4. All subway (7-miles). Not what anyone is suggesting, but included for comparison. $1.5 billion

(Note that the costs of about 40 LRVs plus a shop facility would add perhaps $75 million to the above estimates.)

APPENDIX B

Estimated Travel Times for Light Rail Alternatives

MEMORANDUM

TO: Geary Light Rail Transit Task Force

FROM: Carl Natvig, Muni Service Planning

SUBJECT: Estimated Travel Times for Light Rail Alternatives

DATE: February 10, 1988

Attached are a number of tables outlining projected travel times for various light rail alternatives for Geary. (These tables have been slightly reorganized and corrected from those distributed at the January meeting. The January tables can, therefore, be discarded.)

The key table here is Table 1 which is a summary table providing the estimated travel times from the end of the line to Market Street for each alternative. This table also provides estimates of average access time including walking, waiting, and, in the case of the subways to 27th Avenue or 48th Avenue, time for transferring from a feeder bus to a subway station. The remainder of the tables provide back-up information for those who wish to delve more deeply into the factors which may influence running times for different transit systems on Geary.

Table 1 (Summary Table)

The alternatives are listed in the first column. The corresponding travel times on the transit vehicle are in the second column. The access time including walking and waiting are in the third column. The sums of travel times on the vehicle and the access times are in the fourth column. And, the savings as compared to the current local 38-GEARY bus including the access times are in the fifth or last column to the right. It should be noted that the access time for the subway alternatives to 27th Avenue or 48th Avenue include a portion of riders traveling by feeder bus to the subway station. Since subway stations are expensive to construct and must, therefore, be too far apart for many to walk, it is assumed that a parallel local feeder bus would be required for the subways that go beyond Collins.

Articulated Diesel (Current). The alternative on the first line is the existing local bus service for comparison. The number shown in the second column, 45 minutes, is within a minute of the current running time during the rush hour of this bus from Market to Ft. Miley (plus a couple of minutes for the extra distance to 48th Avenue since the local only goes to Ft. Miley during the day). This number in the table is a calculated number based on a

number of assumptions regarding cruising speed, acceleration, deceleration, loading time, slower speed on hills, and traffic signal delay. Though this is a theoretical calculation, the number is very close to actual experience. The same formulas are used to calculate the travel times for the other alternatives using assumptions as to speed, acceleration, loading time, etc. which have been measured for the type of vehicle in each alternative.

Light Rail in Traffic. This alternative assumes light rail operating in traffic without priority at signals or special transit lanes. The light rail is shown as being faster here with a 37.5 minute travel time since the number of stops is reduced east of Van Ness to two block spacing from one block spacing. Also, light rail vehicles are faster due to faster loading, as well as, faster acceleration and hill climbing due to having greater power than articulated diesel busses.

Light Rail With Priority This alternative assumes light rail priority at signals, a transit mall or special lanes east of Van Ness, and a transit median to the west of Gough. Several minutes are saved due to substantial reduction of signal delay and slightly faster speeds in the median resulting in a travel time of 30.1 minutes.

Light Rail with Priority and Subway to Laguna This alternative assumes light rail in subway to Laguna with traffic signal priority and a median on the rest of the line. An additional savings of 2.5 minutes is achieved due to the 55 mph operation permitted in the subway and the reduction in stops resulting in a total travel time on vehicle of 27.6 minutes.

Light Rail with Priority and Subway to 27th Avenue This alternative assumes light rail in subway to 27th Avenue with traffic signal priority and a median on the rest of the line. Additional savings are achieved due to the the subway and the reduction in stops resulting in a total travel time on vehicle of 19.6 minutes.

Light Rail with Priority and Subway to 48th Avenue This alternative assumes light rail in subway to 48th Avenue. Once again, additional savings are achieved due to the the subway and the reduction in stops resulting in a total travel time on vehicle of 17.3 minutes.

Light Rail with Priority and Subway from Polk to Collins This alternative assumes light rail in subway from Polk to Collins with traffic signal priority and a median on the rest of the line. A savings of 2.5 minutes compared to surface light rail with priority is achieved due to the 55 mph operation permitted in the subway and the reduction in stops resulting in a total travel time on vehicle of 27.6 minutes as with the subway to Laguna.

High Speed Subway This alternative is roughly equivalent to a BART type operation but with even higher speed cars capable of 80 mph. The time savings with only 5 stops is dramatic; the total on vehicle travel time is only 9.1 minutes. However, when average access time to reach the station of 15.4 minutes including transfer from a feeder bus is added, the overall travel time is still 24.6 minutes, a few minutes less than the overall travel time on the other subway alternatives.

Tables 2 and 3

Table 2 shows running time from one point on the line to another for each alternative excluding access time. Table 3 shows cumulative running times on the line from Market Street to several points on the line for each alternative excluding access time.

Tables 4 and 5

Since the largest determinant of travel time for any of the alternative is the number of stops, Tables 4 and 5 show the relationship between running time and the number of stops for each alternative. Table 5 includes access time; table 4 does not.

Tables 6 through 12

The remainder of the tables list the assumptions for speed, acceleration, traffic signal delay, stops, access time, etc. used to calculate the running times in Tables 1 through 5.

The factors employed in the calculations include:

Cruising speed. (Table 6)
Slower cruising speed on hills. (Table 6)
Number of stops. (Table 7)
Net delays for:
- Acceleration and deceleration per stop.
- Loading time per stop.
- Hill climbing during acceleration per stop.
- Traffic signal delay relative to stops.
- Loading time per trip.
- Traffic signal delay per trip.
- (Table 8)

Average access times:
- By foot. (Table 9)
- Waiting for first vehicle. (Table 10)
- Feeder bus travel time for subway alternatives. (Table 11)
- Transfer from feeder bus to subway for subway alternatives. (Table 12)

The formulas accurately estimate the current scheduled running time of the 38-GEARY local (37 stops) and the 38L-GEARY LIMITED (20 stops). Surface operation is of course subject to intermittent traffic delays which are not present in subway operation and which are not factored into these tables. Generally, since these delays do not occur on every trip or in the same segment of the route on every trip, they are accommodated by adding extra layover time at the ends of the line in the drivers schedule.

A brief explanation of the key assumptions in the supporting tables, 6 through 12, follows:

Table 6. The cruising speed of light rail in medians, assumed to be provided west of Gough, is assumed to be about 5 mph faster than parallel traffic. The very long stop spacing in a high speed subway would allow the higher speed of 80 mph as compared to the 55 mph possible in subways with close stop spacing. Hill climbing for light rail is better than for the articulated bus due to a higher power to weight ratio. Additional hill climbing time at cruising speeds are approximations. The subway alternatives would experience less hill climbing delay by tunneling under the steeper hills.

Table 7. Light rail would stop every other block east of Van Ness instead of the current single block spacing. The cost of subway stations would tend to require the longer stop spacings shown for the subway alternatives.

Table 8. Light rail would have less acceleration delay than articulated busses due to a better power to weight ratio. The subway alternatives have a longer acceleration and deceleration delay due to the higher cruising speed requiring more time to accelerate to and decelerate from the higher cruise speeds possible in the subway. The current articulated bus operation has a constant loading time per trip due to the need to load everyone through the front door; therefore, reducing the number of stops would simply increase the loading time per stop proportionately. A new rail system would allow loading through all doors on the vehicle; hence, the loading time would be unaffected by an additional 1 to 3 persons per door per stop.

Traffic signals are set for automobiles which of course do not stop to pick-up passengers. Stopping to pick-up passengers, therefore, causes the transit vehicle to fall out of sequence with the traffic signal system causing the transit vehicle to be stopped by red lights. The time spent at traffic lights is roughly proportional to the time spent loading. Timing signals for transit or providing pre-empts or partial pre-empts for transit would substantially cut down on travel time. It is assumed that such transit priority would be provided for a new surface light rail system.

Table 9. The access time on foot is equal to the sum of the average walking times for a patron at each end of the trip which is equal to the time required to walk one quarter of the average distance between stops at each end of the trip at an average speed of 3 mph. The walking time, therefore, increases as the number of stops decreases and the distance between stops increases. However, it is assumed that those who are more than 500 feet from a subway station would take a feeder bus; hence, the average walking time for 20 or fewer stops on route (the longer subway alternatives) show a lesser walking time corresponding to the time to reach a feeder bus stop.

Table 10. An average waiting time of one half the headway is assumed. The headway for the surface rail service is assumed to be 7 minutes, the same as current bus service. A policy headway of 10 minutes for a parallel bus feeder service for the longer subway alternatives is assumed. A headway of 10 minutes is assumed for the longer subway alternatives since it is assumed that longer trains could conveniently be operated in the subway.

Table 11. The average travel distance for a feeder bus is assumed to be equal to the sum of one quarter of the average distance between stops for the longer subway alternatives for each end of the trip. It is assumed that those within 500 feet of the subway stations would walk to the stations. The average waiting time of 5 minutes for the feeder bus for the longer subway alternatives is reduced by the number of passengers within 500 feet of the subway stations who would walk to the station and not take a feeder bus.

Table 12. This table sums the access times in tables 9 through 11.

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TABLE 1
GEARY CORRIDER RUNNING TIME ESTIMATES
48th Ave to Market
2/9/88

Total Travel & Average Access Time	Travel Time on Vehicle (min)	Access & Wait Time by Foot & Feeder Bus (min)	Sum of Access & Travel Time (min)	Time Savings Compared to Current (min)	
Articulated Diesel (Current)	45.0	5.1	50.0	0.0	
Light Rail in Traffic	37.5	5.3	42.9	7.2	
Light Rail With Priority	30.1	5.3	35.4	14.7	
Light Rail With Priority &					
Subway--Market to Laguna	27.6	5.1	32.7	17.4	
Subway--Market to 27th Ave	19.6	10.9	30.5	19.5	-Includes Feeder Bus
Subway--Market to 48th Ave	17.3	11.3	28.6	21.4	-Includes Feeder Bus
Subway--Polk to Collins	27.6	5.5	33.2	16.9	
High Speed Subway	9.1	15.4	24.6	25.5	-Includes Feeder Bus

TABLE 2
GEARY CORRIDER RUNNING TIME
ESTIMATES

Vehicle Travel Time Point to Point 2/9/88	Current Bus	Light Rail in Traffic	Light Rail with Priority	Subway to Laguna	Subway to 27th	Subway to 48th	Subway Polk to Collins	High Speed Subway
Market to Van Ness	10.2	5.8	4.6	2.9	2.9	3.0	4.6	1.7
Van Ness to Laguna	2.6	2.4	2.0	1.0	1.0	1.0	1.0	V
Laguna to Presidio	6.3	5.6	4.4	4.4	3.0	3.1	3.1	2.0
Presidio to Collins	2.8	2.3	1.9	1.9	0.4	0.4	1.7	V
Collins to Arguello	3.8	3.5	2.7	2.7	1.8	1.8	2.7	1.6
Arguello to 27th Ave	11.0	10.3	8.0	8.0	4.0	4.2	8.0	V
27th Ave to 48th Ave	8.2	7.6	6.3	6.3	6.3	3.8	6.3	3.9
Total	45.0	37.5	30.1	27.4	19.4	17.3	27.6	9.2

Note: There are no stops in "High Speed Subway" in segments marked "V". Travel times in these segments are combined into figures on following line.

TABLE 3
GEARY CORRIDER RUNNING TIME
ESTIMATES

Vehicle Travel Time Cumulative From Market 2/9/88	Current Bus	Light Rail in Traffic	Light Rail with Priority	Subway Market to Laguna	Subway Market to 27th	Subway Market to 48th	Subway Polk to Collins	High Speed Subway
Market to Van Ness	10.2	5.8	4.6	2.9	2.9	3.0	4.6	1.7
Market to Laguna	12.8	8.2	6.7	4.0	3.9	4.0	5.7	
Market to Presidio	19.1	13.8	11.1	8.4	6.8	7.1	8.7	3.7
Market to Collins	21.9	16.1	12.9	10.2	7.3	7.5	10.4	
Market to Arguello	25.7	19.6	15.7	13.0	9.0	9.3	13.2	5.3
Market to 27th Ave	36.7	29.9	23.7	21.0	13.0	13.5	21.2	
Market to 48th Ave	45.0	37.5	30.1	27.4	19.4	17.3	27.6	9.2

TABLE 4
GEARY CORRIDER RUNNING TIME ESTIMATES
48th Ave to Market
2/9/88

Vehicle Travel Time	Proposed Stops Total	Proposed Run Time (min)	Savings Compared to Current (min)	TOTAL TRAVEL TIME WITH STOPS (in minutes) Stops 0	5	17	20	29	30	32	37
Articulated Diesel (Current)	37	45.0	0.0	15.1	29.5	35.3	36.7	41.1	41.6	42.5	45.0
Light Rail in Traffic	32	37.5	7.4	14.1	17.7	26.5	28.7	35.3	36.1	37.5	41.2
Light Rail With Priority	32	30.1	14.9	12.5	15.2	21.8	23.5	28.4	29.0	30.1	32.8
Light Rail With Priority & Subway--Market to Laguna	30	27.6	17.4	10.6	13.4	20.2	21.9	27.0	27.6	28.7	31.5
Subway--Market to 27th Ave	20	19.6	25.3	8.0	10.9	17.9	19.6	24.9	25.5	26.6	29.5
Subway--Market to 48th Ave	17	17.3	27.6	6.8	9.9	17.3	19.2	24.7	25.3	26.6	29.6
Subway--Polk to Collins	29	27.6	17.3	11.2	14.0	20.8	22.5	27.6	28.2	29.3	32.2
High Speed Subway	5	9.1	35.8	4.5	9.1						

TABLE 5
GEARY CORRIDER RUNNING TIME ESTIMATES
48th Ave to Market
2/9/88

Total Travel Time Including Average Access Time	Proposed Stops Total	Proposed Run Time (min)	Savings Compared to Current (min)	TOTAL TRAVEL TIME BY FOOT, BUS, & RAIL (in minutes)) Stops 5	17	20	29	30	32	37
Articulated Diesel (Current)	37	50.0	0.0	42.0	44.0	45.1	46.6	47.0	47.9	50.0
Light Rail in Traffic	32	42.9	7.2	30.3	35.3	37.1	40.8	41.5	42.9	46.3
Light Rail With Priority	32	35.4	14.7	27.8	30.5	31.8	33.9	34.4	35.4	37.9
Light Rail With Priority & Subway--Market to Laguna	30	32.7	17.4	26.0	28.9	30.3	32.1	32.7	34.0	36.6
Subway--Market to 27th Ave	20	30.5	19.5	26.3	29.2	30.5	31.9	32.4	33.4	36.1
Subway--Market to 48th Ave	17	28.6	21.4	25.4	28.6	30.0	31.7	32.3	33.4	36.2
Subway--Polk to Collins	29	33.2	16.9	26.6	29.6	30.9	33.2	33.7	34.7	37.3
High Speed Subway	5	24.6	25.5	24.6						

TABLE 6
GEARY CORRIDER
2/9/88
Distances & Non-stop Travel Time

	City Blocks	Block Length (ft.)	Total (ft.)	Total (Miles)	Speed Bus (mph)	Speed Light Rail (mph)	Speed Subwy (mph)	Speed High Speed Subwy (mph)	Non-stop Time Bus	Non-stop Time Light Rail Traffi	Non-stop Time Light Rail	Non-stop Time Subwy Mkt -48th	Non-stop Time Subwy Mkt -Lag	Non-stop Time Subwy Mkt -27th	Non-stop Time Subwy Polk -Coll	Non-stop Time High Speed Subwy
Market to Van Ness	11	482	5302	1.00	21	25	55	80	2.87	2.87	2.41	1.10	1.10	1.10	2.41	0.75
Van Ness to Laguna	4	482	1928	0.37	25	25	55	80	0.88	0.88	0.88	0.40	0.40	0.40	0.40	0.27
Laguna to Presidio	11	482	5302	1.00	35	40	55	80	1.72	1.72	1.51	1.10	1.51	1.10	1.10	0.75
Presidio to Collins	5	310	1550	0.29	25	30	55	80	0.70	0.70	0.59	0.32	0.59	0.32	0.32	0.22
Collins to Arguello	9	310	2790	0.53	25	30	55	80	1.27	1.27	1.06	0.58	1.06	0.58	1.06	0.40
Arguello to 27th Ave	26	310	8060	1.53	25	30	55	80	3.66	3.66	3.05	1.67	3.05	1.67	3.05	1.14
27th Ave to 48th Ave	21	310	6510	1.23	30	30	55	80	2.47	2.47	2.47	1.35	2.47	2.47	2.47	0.92
Subtotal									13.57	13.57	11.96	6.50	10.16	7.62	10.80	4.47
Hillclimbing Time									1.50	0.50	0.50	0.33	0.42	0.33	0.42	0.00
Total	87		31442	5.95					15.07	14.07	12.46	6.83	10.58	7.95	11.22	4.47

TABLE 7
GEARY CORRIDER
2/9/88
Stops

	Blocks	Length	Stops Bus	Stops Light Rail	Stops Subway Mkt -48th	Stops Subway Mkt -Lag	Stops Subway Mkt -27th	Stops Subway Polk -Coll	High Speed Subway
Market to Van Ness	11	482	9	4	3	3	3	4	1
Van Ness to Laguna	4	482	2	2	1	1	1	1	1
Laguna to Presidio	11	482	5	5	3	5	3	3	0
Presidio to Collins	5	310	2	2	0	2	0	2	1
Collins to Arguello	9	310	3	3	2	3	2	3	0
Arguello to 27th Ave	26	310	9	9	4	9	4	9	1
27th Ave to 48th Ave	21	310	7	7	4	7	7	7	1
Total			37	32	17	30	20	29	5

TABLE 8
GEARY CORRIDER
2/9/88
Average Stopping Delays

	Net Accel Decel /Stop (sec)	Load Time /Stop (sec)	Hill Climb /Stop (sec)	Traffic Signal Delay /Stop (sec)	Total Delay /Stop (sec)	Load Time /Trip (sec)	Traffic Signal Delay /Trip (sec)
Articulated Diesel (Current)	15	6	2	6	29	360	360
Light Rail in Traffic	10	16	1	17	44		
Light Rail With Priority	11	16	1	5	33		
Light Rail With Priority &							
Subway--Market to Laguna	14	16	1	3	34		
Subway--Market to 27th Ave	19	16	0	0	35		
Subway--Market to 48th Ave	21	16	0	0	37		
Subway--Polk to Collins	15	16	0	3	34		
High Speed Subway	40	16	0	0	56		

TABLE 9
GEARY CORRIDER RUNNING TIME ESTIMATES
48th Ave to Market
2/9/88

Access Time on Foot (Less Than 500 Ft. Would Walk to Rail Stop)	Proposed Stops Total	Proposed Run Time (min)	AVERAGE ACCESS TIME ON FOOT (in minutes) Stops 5	17	20	29	30	32	37
Articulated Diesel (Current)	37	1.6	1.7	1.7	1.7	2.0	1.9	1.8	1.6
Light Rail in Traffic	32	1.8	1.7	1.7	1.7	2.0	1.9	1.8	1.6
Light Rail With Priority	32	1.8	1.7	1.7	1.7	2.0	1.9	1.8	1.6
Light Rail With Priority & Subway--Market to Laguna	30	1.6	1.7	1.7	1.7	1.6	1.6	1.8	1.6
Subway--Market to 27th Ave	20	1.7	1.7	1.7	1.7	2.0	1.9	1.8	1.6
Subway--Market to 48th Ave	17	1.7	1.7	1.7	1.7	2.0	1.9	1.8	1.6
Subway--Polk to Collins	29	2.0	1.7	1.7	1.7	2.0	1.9	1.8	1.6
High Speed Subway	5	1.7	1.7						

TABLE 10
GEARY CORRIDER RUNNING TIME ESTIMATES
48th Ave to Market
2/9/88

Average Transfer Time (Less Than 500 Ft. Would Walk to Rail Stop)	Proposed Stops Total	Proposed Run Time (min)	WAIT TIME FOR TRANSFERR (in minutes)) Stops 5	17	20	29	30	32	37
Articulated Diesel (Current)	37	0.0	3.2	2.6	2.4	0.0	0.0	0.0	0.0
Light Rail in Traffic	32	0.0	3.2	2.6	2.4	0.0	0.0	0.0	0.0
Light Rail With Priority	32	0.0	3.2	2.6	2.4	0.0	0.0	0.0	0.0
Light Rail With Priority & Subway--Market to Laguna	30	0.0	3.2	2.6	2.4	0.0	0.0	0.0	0.0
Subway--Market to 27th Ave	20	3.4	4.6	3.6	3.4	0.0	0.0	0.0	0.0
Subway--Market to 48th Ave	17	3.6	4.6	3.6	3.4	0.0	0.0	0.0	0.0
Subway--Polk to Collins	29	0.0	3.2	2.6	2.4	0.0	0.0	0.0	0.0
High Speed Subway	5	4.6	4.6						

TABLE 11
GEARY CORRIDER RUNNING TIME ESTIMATES
48th Ave to Market
2/9/88

Average Travel Time by Feeder Bus (Less Than 500 Ft. Would Walk to Rail Stop)	Proposed Stops Total	Proposed Run Time (min)	AVERAGE TRAVEL TIME BY FEEDER BUS (in minutes)) Stops						
			5	17	20	29	30	32	37
Articulated Diesel (Current)	37	0.0	4.1	1.0	0.8	0.0	0.0	0.0	0.0
Light Rail in Traffic	32	0.0	4.1	1.0	0.8	0.0	0.0	0.0	0.0
Light Rail With Priority	32	0.0	4.1	1.0	0.8	0.0	0.0	0.0	0.0
Light Rail With Priority & Subway--Market to Laguna	30	0.0	4.1	1.0	0.8	0.0	0.0	0.0	0.0
Subway--Market to 27th Ave	20	0.8	4.1	1.0	0.8	0.0	0.0	0.0	0.0
Subway--Market to 48th Ave	17	1.0	4.1	1.0	0.8	0.0	0.0	0.0	0.0
Subway--Polk to Collins	29	0.0	4.1	1.0	0.8	0.0	0.0	0.0	0.0
High Speed Subway	5	4.1	4.1						

TABLE 12
GEARY CORRIDER RUNNING TIME ESTIMATES
48th Ave to Market
2/9/88

Total Average Access Time	Proposed Stops Total	Proposed Access Time (min)	TOTAL ACCESS TIME (in minutes) BY FOOT, BUS, WAITING Stops						
			5	17	20	29	30	32	37
Articulated Diesel (Current)	37	5.1	12.6	8.7	8.4	5.5	5.4	5.3	5.1
Light Rail in Traffic	32	5.3	12.6	8.7	8.4	5.5	5.4	5.3	5.1
Light Rail With Priority	32	5.3	12.6	8.7	8.4	5.5	5.4	5.3	5.1
Light Rail With Priority & Subway--Market to Laguna	30	5.1	12.6	8.7	8.4	5.1	5.1	5.3	5.1
Subway--Market to 27th Ave	20	10.9	15.4	11.3	10.9	7.0	6.9	6.8	6.6
Subway--Market to 48th Ave	17	11.3	15.4	11.3	10.9	7.0	6.9	6.8	6.6
Subway--Polk to Collins	29	5.5	12.6	8.7	8.4	5.5	5.4	5.3	5.1
High Speed Subway	5	15.4	15.4						

APPENDIX C

Resolution of the Board of Supervisors Establishing a Geary Transit Task Force

AMENDED IN COMMITTEE
8/21/85

FILE NO. 7-86-7 RESOLUTION NO.

[Geary Transit Task Force]

ESTABLISHING A GEARY TRANSIT TASK FORCE.

WHEREAS, The problems of traffic and congestion are extreme in San Francisco adversely affecting the lives of all persons in the City; and

WHEREAS, The Geary corridor is a primary arterial crossing the width of San Francisco; and

WHEREAS, The combination of private vehicles and buses exacerbates the already congested flow of traffic and persons along Geary; and

WHEREAS, A light rail traffic or an electrification of the No. 38 Line alternative would greatly smooth the flow of people along Geary; and

WHEREAS, Light rail transit once successfully operated along Geary; and

WHEREAS, Hundreds of people have petitioned City officials to initiate plans for the return of light rail transit in the Geary corridor; and

WHEREAS, The development of such light rail or an electrification of the No. 38 Line transit requires the consideration of many City agencies and private organizations; now, therefore, be it

/ / /

/ / /

RESOLVED, There is hereby established a Geary Transit Task Force of not more than twenty-one (21) persons with eleven (11) members suggested by the Board of Supervisors and appointed by the Mayor with one representative from each of the following bodies:

San Francisco Tomorrow
Chamber of Commerce
Union Square Merchants Association
Municipal Railway
Mayor's Office
Board of Supervisors
Geary Street Merchants Association
Geary Corridor Citizens Committee
Planning Association for the Richmond
Western Addition Neighborhood Association
Fillmore Merchants Association
North of Market Planning Commission; and, be it

FURTHER RESOLVED, Each representative shall serve for one year without compensation; and be it

FURTHER RESOLVED, The Task Force shall prepare a public report within the one year, detailing the financial and technical feasibility of a light rail or electrification of the No. 38 Line transit system along the Geary Street Corridor; and, be it

FURTHER RESOLVED, That the Clerk of the Board is hereby instructed to transmit a copy of this resolution to her Honor, the Mayor, urging her to transmit it to each of the agencies and groups designated herein with the request that they take all necessary steps to effectuate the intent.

8310E

SUPERVISOR JOHN L. MOLINARI

BOARD OF SUPERVISORS

Adopted - Board of Supervisors, San Francisco September 22, 1986

Ayes: Supervisors Britt Hongisto Hsieh Kennedy Maher Molinari
Nelder Silver Walker Ward

Absent: Supervisor Kopp

I hereby certify that the foregoing resolution
was adopted by the Board of Supervisors
of the City and County of San Francisco

John L. Taylor
Clerk

File No.
7-86-7

OCT 3 1986
Date Approved

Mayor

APPENDIX D

Sample Letter of Appointment from the Mayor

OFFICE OF THE MAYOR
SAN FRANCISCO

DIANNE FEINSTEIN

July 31, 1987

Peter Straus
MUNI
949 Presidio Avenue
San Francisco, CA 94115

Dear Mr. Straus:

You are hereby appointed to the Geary Transit Task Force pursuant to Board of Supervisors Resolution No. 848-86. The Task Force will function as a citizens advisory committee to the Public Utilities Commission, to advise the PUC and Muni as to the neighborhoods' and passengers' viewpoints on the long-range needs of the Geary corridor.

The last comprehensive look at transit improvements in the Geary-Richmond Corridor was 15 years ago. At that time, there was widespread dissension in the community as to what San Francisco's future course of action should be.

The Geary Transit Task Force is being created in order to avoid the mistakes of the past, in which a major study was conducted before there was any consensus as to whether any project should be considered at all. The Task Force is charged with the responsibility to consider the range of options for transit development in the Geary Corridor and to attempt to develop a consensus among all portions of the community-- residents, neighborhood merchants, downtown business groups, the Union Square retail community, and representatives of the city at large--as to what range of alternatives would be acceptable, and how any major capital project in this corridor might be coordinated with other City and regional transit projects.

Resources are limited--both for construction and operation and even for technical support of a study at this time.

Although MUNI will provide a limited amount of technical support to the Task Force, to allow order of magnitude costs to be identified and basic alternatives laid out, the Task Force will not oversee a detailed technical analysis at this time-- the technical work can and should be done after you have charted a general course for us.

If the Task Force is able to forge a consensus, and one which is coordinated with the need for other transportation improvement projects as well, then it will have played an invaluable role in helping the Public Utilities Commission, the Board of Supervisors, the Mayor's Office, and the public in setting a direction for our City's future.

The first meeting of the Task Force will be held Wednesday, August 19, 1987, at 6:00 p.m., at the San Francisco Municipal Railway office at 2640 Geary Boulevard. Peter Straus, Muni's representative on the Task Force, will coordinate this and future meetings. Please confirm your attendance with Mr. Straus at 923-6100.

Thank you for agreeing to serve in this capacity. Your contribution to the betterment of San Francisco through your participation in the Task Force is greatly appreciated.

Sincerely yours,

Dianne Feinstein
Mayor

DF/dsr